High Peak Borough Council

Annual Status Report 2023

Bureau Veritas

July 2023

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Document Control Sheet

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	Name	Job Title	Signature
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Approved By	D Clampin	Senior Consultant	

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High Peak Borough Council

working for our community

2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: July 2023

Information	<Local Authority Name> Details
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Report Reference Number	High Peak 2023 ASR
Date	July 2023

Executive Summary: Air Quality in Our Area

Air Quality in High Peak Borough Council

Air pollution is associated with a number of adverse health impacts. It is 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[1,2].

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

High Peak Borough Council (HPBC) is one of the eight district and borough authorities that make up the county of Derbyshire. HPBC is located in the northwest of the region (population circa 92,000) between the Greater Manchester conurbation to the west and the metropolitan areas of Sheffield and Barnsley to the east.

The main source of air pollution within HPBC is road traffic emissions from the major roads that cross the borough (the A6, the A628 and the A57) and form key travel routes between the cities of Manchester and Sheffield, as well as the local roads that connect the borough's main population centres (Glossop, New Mills, Whaley Bride, Chapel-en-le-Frith and Buxton) to these key travel routes. Residential exposure to the increased pollutant concentrations caused by these emissions is the primary concern as there are a number of properties located within close proximity to the road network.

Two Air Quality Management Areas (AQMAs) have been declared within HPBC due to exceedances of the 40 $\mu g/m^3$ annual mean objective for NO_2; Tintwistle AQMA (on the

[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Defra. Air quality appraisal: damage cost guidance, January 2023

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

A628 Woodhead Road) and Dinting Vale AQMA (on the A57 Dinting Vale Road) both declared in 2019.

Monitoring of NO_2 is completed throughout HPBC using a network of passive diffusion tubes. During 2022, there were 57 monitoring locations where diffusion tubes were deployed (with eight locations having been added since 2021) as well as an AURN automatic rural background monitoring site.

For the 9 monitoring sites located within existing AQMAs for which 2021 data was available, a general decrease in annual average NO_2 concentrations was observed in 2022 compared to 2021 data, with only two sites (HP5 and HP25) reporting increased annual average concentration levels. One site (HP63) reported an exceedance of the annual average NO_2 objective (40 µg/m^3), and one additional site (HP25) reported an annual average NO_2 concentration that was within 10% of the objective (36 µg/m^3). It should be noted however that in both cases after distance correction, predicted annual concentration levels at the closest receptor did not exceed the objective, nor were they within 10% of it.

For the 40 sites outside of existing AQMAs for which 2021 data was available, a general increase in NO_2 concentrations was observed in 2022 compared to 2021 data, with only 14 sites reporting decreases in annual average concentration levels. During 2022, two monitoring locations (HP42 and HP44) outside of existing AQMAs recorded exceedances of the annual mean NO_2 objective (40 µg/m^3) and two sites (HP33 and HP41) recorded concentrations within 10% of the annual mean objective (36 µg/m^3). Following distance correction to determine levels at the nearest receptors at each site, no sites exceeded the annual objective, but all remained within 10%. All four sites are located along the Fairfield Road in Buxton, which was within the study area of a detailed assessment undertaken at the end of 2022 in order to inform the decision on whether a new AQMA should be declared. This decision was delayed during the COVID-19 pandemic due to nationally enforced lockdowns resulting in the of shifting priorities and resourcing constraints in 2020 and 2021. HPBC intends to declare this area as an AQMA in 2023, and also established two additional monitoring sites (HP64 and HP65) to increase coverage of the Fairfield Road into Buxton Town Centre.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[5] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero[6] details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

HPBC has taken forward a number of measures during the reporting year of 2023 in pursuit of improving local air quality:

- *Air Quality Action Plan (AQAP) update* - a conservative revised detailed assessment and source apportionment exercise has been completed for all existing AQMAs, and the area of concern in Fairfield Road in Buxton. This established that the current AQMAs should remain in place, and monitoring expanded in some instances. It also confirms that the area of concern at Fairfield Road, Buxton should be declared as an AQMA.
- *Extension of Smoke Control Zones* – HPBC intend to extend the current smoke control zones across the borough to more populous towns such as Chapel-en-le-Frith, New Mills and Whaley Bridge. In addition to the improvements in their regulation, could significantly improve emissions from domestic burning.
- *Green Towns Scheme* - A pilot scheme in Buxton Town Centre to lower the speed limit from 30mph to 20mph was launched in 2022 by Derbyshire County Council, in conjunction with other stakeholders including HPBC. The scheme is to be designed to assess if lower speed limit could improve health and could encourage healthier and more sustainable modes of transport. It is proposed that a lower safer speed,

[5] Defra. Environmental Improvement Plan 2023, January 2023

[6] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

with fewer accelerations and decelerations would improve air quality and reduce carbon emissions and could encourage more people to walk or cycle for shorter journeys.

Conclusions and Priorities

During 2022, one exceedance of the NO_2 annual mean objective was recorded within the existing Tintwistle AQMA. Although it should be noted that, following fall-off with distance correction, the annual mean fell to below 10% of the annual mean AQS objective. Two exceedances were recorded along Fairfield Road – the area of the proposed new AQMA. Following distance correction, concentrations reported at both sites remained within 10% of the annual mean NO_2 objective (36 µg/m^3).

Annual mean NO_2 concentrations monitored via diffusion tubes were higher at 31 (of 57 sites when compared to 2021 levels. The largest annual increase was 4.0 µg/m^3 at HP44 along Fairfield Road.

Regarding the two existing AQMAs, it is recommended that both Tintwistle and Dinting Vale remain in force, as monitoring sites within both AQMAs have recorded exceedances of the annual mean objective within the past five years, with the exception of 2020 and 2021 in which concentrations across the UK were reduced relative to the Covid-19 pandemic.

The revised AQAP is in preparation. A conservative revised detailed assessment and source apportionment exercise has been completed for all existing AQMAs, and the area of concern in Fairfield Road in Buxton. This established that the current AQMAs should remain in place, and monitoring expanded in some instances. It also confirms that the area of concern at Fairfield Road, Buxton should be declared as an AQMA. The new Buxton AQMA is set to be declared after approval from cabinet, which has provisionally been set for summer 2023.

Local Engagement and How to get Involved

The public can engage with HPBC via their website which contains further local information on the following:

- Air quality monitoring;
- Declared AQMAs;
- Smoke control areas; and
- Wood burning stoves.

The public can also report any concerns about air quality via the Council's website.

As the main source of air pollution within the borough is road traffic, HPBC encourages consideration of alternative modes of transport by promoting sustainable transport choices. Further information can be found on the Derbyshire County Council website, which discusses:

- Sustainable travel and smarter choices (cycling, public transport, car sharing schemes and community transport schemes); and
- School travel plans (including Travel Smart – a range of practical initiatives and curriculum projects to promote cycling, scooting, car shar and public transport on the school journey).

In addition, HPBC is currently involved in the Air Aware project in collaboration with neighbouring Staffordshire authorities, contributing to the Air Aware website which provides downloadable materials and further information on:

- Funding;
- Volunteering;
- Small actions that can make a big difference, such as:
    - Turning your car off;
    - Car sharing;
    - Getting on your bike (or scooter);
    - Walking;
    - Getting your car serviced;
    - Working smarter;
    - Using public transport;
    - Zero and low carbon vehicles; and
    - Renewable home energy sources.

Local Responsibilities and Commitment

This ASR was prepared by Bureau Veritas on behalf of the Environmental Health Department of High Peak Brough Council with the support and agreement of the following officers and departments:

- Communities and Climate Change
- Asset Management
- Service Commissioning

This ASR has been approved by:

- Alicia Patterson – Head of Environmental Health

This ASR has been submitted to the Director of Public Health Derbyshire and is awaiting feedback

If you have any comments on this ASR please send them to Dr Daniel McCrory at:

Environmental Health

High Peak Borough Council

Town Hall

Buxton

ST17 6EL

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Tables

1 Local Air Quality Management

This report provides an overview of air quality in HPBC during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by HPBC to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

A summary of AQMAs declared by High Peak Borough Council can be found in Table 2.1. The table presents a description of the two AQMAs that are currently designated within HPBC. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean.

We propose to declare a new AQMA along Fairfield Road in Buxton due to exceedances of the NO_2 annual mean air quality objective. A conservative revised detailed assessment and source apportionment exercise has been completed for all existing AQMAs, and the area of concern in Fairfield Road in Buxton (See Appendix C: Additional Air Quality Works Undertaken by High Peak Borough Council During 2022). This established that the current AQMAs should remain in place, and monitoring expanded in some instances. It also confirmed that the area of concern at Fairfield Road, Buxton should be declared as an AQMA. The new Buxton AQMA is set to be declared after approval from cabinet, which has provisionally been set for summer 2023.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
HPBC AQMA No. 1: Tintwistle	Declared 11/09/2019	Nitrogen dioxide NO_2 Annual Mean	The designated area incorporates the following section of the Woodhead Road; between the Bank Lane/ Woodhead Road Junction and the Old Road/ Woodhead Road Junction	YES	46.6 µg/m^3	35.2 µg/m^3	Not compliant	Ongoing	Ongoing
HPBC AQMA No. 2: Dinting Vale	Declared 04/12/2019	Nitrogen dioxide NO_2 Annual Mean	The AQMA encompasses the properties between the A626 Glossop Road / A57 Dinting Vale Junction and the A57 Dinting Vale/ Dinting Lane Junction	YES	40.6 µg/m^3	32.2 µg/m^3	3 years*	Ongoing	Ongoing

* Including 2020 and 2021, which are likely anomalous due to the impact of COVID-19 and national lockdown restrictions on emissions

☒ **HPBC confirm the information on UK-Air regarding their AQMAs is up to date.**

☐ **HPBC confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to Address Air Quality in High Peak Borough Council

<u>2022 ASR Appraisal Comments</u>

Defra's appraisal of last year's ASR concluded that "the report is well structured, detailed, and provides the information specified in the Guidance". The following comments were also made to help inform future reports:

1. *The Council have detailed extensively its measures in place to reduce pollutant concentrations within the Borough. This is welcomed and should be continued with regular reviews of the measures to ensure they are still relevant.*
2. *QA/QC procedures are appropriate, with sufficient evidence for all procedures provided in the appendix.*
3. *The highest pollutant concentration in HPBC was recorded outside of the existing AQMAs in Buxton during 2021. A detailed assessment was originally delayed informing a decision on whether a new AQMA should be declared due to the COVID-19 pandemic. It is encouraged that this decision should be made as soon as possible.*

A detailed modelling assessment was completed in 2023 and is included in the additional Appendix.

4. *The Council should conduct regular reviews of its monitoring programme, to ensure that monitoring takes place at any sites of potential exceedance with relevant exposure.*

During the 2022 monitoring year, new diffusion tubes were deployed in areas that have consistently reported high NO_2 annual mean concentrations in recent years. Further detail on this is provided in Section 3.2.1: Nitrogen Dioxide (NO2).

5. *High Peak Borough Council have made reference to the Public Health Outcome Framework relating to air quality and have provided the D01 indicator, with a comparison to the wider area as a whole and to the rest of England. The 2022 ASR has also been signed off by the relevant Director of Public Health.*
6. *It is welcomed that the Council have included monitoring results from Ladybower AURN site in the absence of a Council automatic monitor to provide a further*

overview of NO_2 concentrations within the Borough. This is encouraged and should be continued in future ASRs.

Details and monitoring results for 2022 can be found in Appendix A: Monitoring Results and are discussed throughout.

7. *The Council should ensure that there are no 'Error! Reference Source not found' within the report.*

Links and references have been updated and checked in this year's ASR to ensure all are in working order.

Progress and Impact of Measures in 2023

HPBC has taken forward a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 49 measures are included within Table 2.2, with the type of measure and the progress HPBC have made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans.

Key completed measures are:

- *Impact assessment of the proposed TPUP Scheme along A628 and A57* – the scheme was approved in December 2022, with a requirement for National Highways to measure air quality in Tintwistle and Dinting Vale AQMAs, and a commitment to mitigate any breaches in air quality objectives resulting from the scheme;
- *Installation of public rapid EV (Electric Vehicle) charging points across borough* – 4 EV charge points installed;
- *Installation of off-street EV charge points across borough* – 4 charge points installed;
- *Encouragement/facilitation of home-working* – an Agile Working Policy has been adopted;
- *Electric vehicles trial and HVO (Hydrogenated Vegetable Oil) trial* – the use of HVO has been integrated into the Fleet.

HPBC also has several ongoing measures that promote travel alternatives such as cycling, walking, car-sharing and public transport.

HPBC expects the following measures to be completed over the course of the next reporting year:

- *Review and introduction of new Smoke Control Zones across the borough* – HPBC currently has Smoke Control Orders covering the majority of Buxton and Glossop, but intends to extend the zones to more populous towns in 2023;
- *Pre-emptive travel advice through app-based communication* – the application is currently being developed and linked to variable messaging signs;
- *Incentivise parking for low emission vehicles* – a parking review is currently being undertaken for the district
- *Encourage taxis licensed by the Council to comply with vehicle emission limits* – this has been on hold while HPBC awaited the outcome of the National Guidance Consultation with taxi drivers planned for 2021.

HPBC's priorities for the coming year are:

- *Air Quality Action Plan Update and declaration of a new Buxton AQMA -* A provisional set of additional measures have been identified to discussed within the steering group (Appendix G: Provisional Additional Measures). Unfortunately, the setting up of the steering groups was in part delayed due to Council elections in early May, purdah and the change of administration. The steering groups are now in the process of being set up with a view to meeting to discuss the proposed measures, with a view to publishing the full strategy by the 4th Quarter of 2023.

HPBC worked to implement these measures in partnership with the following stakeholders during 2022:

- National Highways (North-West);
- Derbyshire County Council (DCC);
- Cenex DCC;
- Midlands Connect;
- Nottinghamshire County Council (NCC);
- Energy Saving Trust;
- Staffordshire Moorlands District Council (SMDC);
- Staffordshire County Council (SCC);
- Transport for Greater Manchester;

- Public Health England (PHE);
- Derby City Council;
- District Councils;
- East Midlands Councils;
- Greater Manchester (GM);
- Buxton Town Team.

HPBC anticipates that the measures in Table 2.2 will help contribute towards compliance within the two currently declared AQMAs, and within the proposed AQMA.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Review and introduce New Smoke Control Zones across Borough	Other	Other	2022	2023	HPBC	HPBC	NO	Partially Funded	<£10k	Planning	Reduction in Emission from domestic combustion	Area of the district covered by Smoke Control Zones	Not yet commenced	Decision will be informed by local members
2	Assessment of impact of the proposed TPUP Scheme along A628 and A57	Traffic Management	UTC, Congestion management, traffic reduction	2017	2022	National Highways (North – West)	Highways England (North – West)	No	Funded	£10k - £50k	Completed	Modelling Results indicated no breaches along the A57 and A628 at the opening of the scheme but impact on AQMA's not assessed	Modelling data	Scheme was approved in November 2022	The scheme was approved in December 2022 with a requirement for National Highways to measure AQ in AQMA's 1 & 2, & a commitment to mitigate any breaches in AQ objectives as a result of the scheme
3	Additional Monitoring of Air Quality in AQMA's	Traffic Management	UTC, Congestion management, traffic reduction	2022	Not yet commenced	National Highways (North – West) / HPBC	Highways England (North – West)	No	Funded	<£10k	Planning	Reduction in emissions	emission data	Not yet commenced	The scheme was approved in December 2022 with a requirement for National Highways to measure AQ in AQMA's 1 & 2, & a commitment to mitigate any breaches in AQ objectives as a result of the scheme
4	Implementation of a Network Intelligence System	Traffic Management	UTC, Congestion management, traffic reduction	2022	2024	DCC	DCC	NO	Fully Funded	£100k - £500k	Implementation	Reduction in emissions	emission data	UTMC is now operational.	https://www.derbyshire.gov.uk/site-elements/documents/pdf/transport-roads/highways-infrastructure-asset-management/connected-futures.pdf
5	Green Towns Scheme	Traffic Management	Reduction of speed limits, 20mph zones	2022	Not yet commenced	DCC/HPBC	DCC	NO	Fully Funded	£50k - £100k	Planning			In consultation phase	https://www.derbyshire.gov.uk/council/have-your-say/consultation-search/consultation-details/greener-towns-20mph-zones.aspx
6	Derbyshire Mobility Hub (Buxton and Hope Valley)	Promoting Low Emission Transport	Other	2022	Not yet commenced	Cenex,DCC/ Midlands Connect	Midlands Connect	NO	Fully Funded	£50k - £100k				Funding Awarded https://www.midlandsconnect.uk/news/100-000-funding-awarded-to-supercharge-sustainable-travel-around-derbyshire/	https://www.midlandsconnect.uk/media/1839/the_future_of_rural_mobility_report_final.pdf
7	Pre- emptive travel advice	Traffic Management / public information	Congestion reduction/app based communication	2022	Mar-23	Derbyshire County Council	DDC	No	Funded	<£10k		Reduction in Stationary traffic, reduction in congestion	Reduction of emission from vehicles	App currently being developed and being linked to variable messaging signs	
8	Installation of public rapid EV Charging points across Brough	Promoting Low Emission Transport	Promote Low Emission Vehicles	2018/ 2019	Ongoing	HPBC / DCC/Nottinghamshire County Council (NCC)	HPBC / DCC/NCC	No	Funded	£50k - £100k	Completed	Reduced Vehicle emissions	No of EV charging points	Phase 1 complete 4 EV charge Points Installed	https://www.transportnottingham.com/driving/electric-vehicle-projects/
9	Installation of off-street EV Charging points across borough	Promoting Low Emission Transport	Promote Low Emission Vehicles	2020	Ongoing	Ongoing	HPBC / DCC/NCC	No	Funded	£50k - £100k	Completed	Reduced Vehicle emissions	increased installation of EV charging points	Phase 2 Complete 4 EV charge Points Installed	https://www.transportnottingham.com/driving/electric-vehicle-projects/

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
10	Installation of EV Charging points across borough	Promoting Low Emission Transport	Promote Low Emission Vehicles	2022	Ongoing	HPBC / DCC/Nottinghamshire County Council (NCC)	HPBC / DCC/NCC	No	Funded	£50k - £100k	Implementation	Reduced Vehicle emissions	increased installation of EV charging points	A report now been commissioned by DCC to produce an EV Delivery Options and Recommendations report	HPBC have put nominated further 8 locations for EV installation
11	Develop Electric Vehicle Charging Strategy	Promoting Low Emission Transport	Developing infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	Ongoing	HPBC / DCC	HPBC / DCC	No	Funded			Reduced Vehicle emissions	Unknown	Near	https://www.derbyshire.gov.uk/site-elements/documents/pdf/environment/climate-change/low-emission-vehicle-infrastructure-strategy-action-plan-2019-to-2029.pdf Action Plan 2019 - 2029
12	Incentivise parking for low emission vehicles	Promoting Low Emission Transport	Emission based parking or permit charges	2021	2023	HPBC/DCC	None	No	Not funded			Reduced emissions from vehicles	TBC	Parking review being undertaken for the district	
13	Continue to promote and increase the installation of EV charging points through development control processes	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015	Operational	HPBC	None	No	Not funded			Reduced emissions from vehicles	Increased installation of EV charging points	EV charging points are conditioned through the planning process, this is to be strengthened by the implementation of Air Quality supplementary planning document	
14	Review of Air Quality, Speed limits and Road Safety along A628	Traffic Management	UTC, Congestion management, traffic reduction	2021	Not yet commenced	National Highways (North – East)	National Highways (North – East)	No	Funded		Planning	Reduced emissions from vehicles	Reduction in traffic congestion	Not yet commenced	NO feedback from National Highways on the progress of the scheme
15	Junction Capacity and route assessment review along A57	Traffic Management	UTC, Congestion management, traffic reduction	2020	Not yet commenced	Derbyshire County Council (DCC)/ HPBC	DCC/ HPBC	No	Funded			Reduced Vehicle emissions	Reduction in traffic congestion	Glossop Gateway Masterplan and local impact report currently being drafted	Local Impact Report (LIR) delayed due to delay in submission Development Consent Order (DCO) application for the A57 link road scheme
16	Work to improve the cycling network around A57 into Glossop	Promoting Travel Alternatives	Promotion of cycling	2020	Not yet commenced	HPBC/DCC	TBC HPBC/DCC/ Grant/ HE designated funds	Yes	Funded			Reduced emissions from vehicles	Additional cycling schemes	Glossop Gateway Masterplan and local impact report currently being drafted	Local Impact Report (LIR) delayed due to delay in submission Development Consent Order (DCO) application for the Trans-Pennine Upgrade Programme (the TPUP Scheme).
17	Review west bound bus stop by Dinting Vale Primary School	Traffic Management	Other	2021	2024	DCC	DCC / HE designated funds	No	Funded			It is difficult to quantify reduction as a result of this measure but implementing this measure will result in reducing traffic queues and as such reduce emissions	Bus stop reviewed	Not yet commenced Discussions have taken place	A cost of around 10K has been established for this proposal

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
18	Glossop Transport and Economy Project	Traffic Management	Strategic highway improvements, re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2022	Not yet commenced	DCC	DCC	NO	Fully Funded	£50k - £100k	Planning			Project delay due to submission of Development Consent Order (DCO) A57 link road	https://www.derbyshire.gov.uk/transport-roads/transport-plans/transport-studies/glossop-trans-project/glossop-transport-and-economy-project.aspx
19	Bus Service Improvement Plan	Promoting Low Emission Transport	Promote Low Emission Vehicles	2020	2029	HPPC / DCC /Energy Saving Trust	Central Government (BSIP)	No	Fully Funded	>£10 million		Reduced emissions from vehicles	Achieve 95% Euro 6 or better by end 2029/30, including a fleet engine retrofit programme & Develop plans for hydrogen and/or electric infrastructure within 4 years	Enhanced Partnership Plan (EP Plan) which formally adopted the	https://derbysbus.info/Derbyshire%20BSIP%20–%20Final%2029-10-21.pdf
20		Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2021	2029	HPBC/DCC	HPBC/DCC	TBC	TBC			Reduced emissions from vehicles	95% Euro 6 or Higher. Hydrogen buses within 4 years	Ongoing	Derbyshire County Councils Bus Service Improvement Plan has a target for increasing the percentage of buses at Euro 6 or higher to 95% by 2029/30 amongst https://derbysbus.info/Derbyshire%20BSIP%20–%20Final%2029-10-21.pdf
21	Increased Focus on AQ in School Travel Plans	Promoting Travel Alternatives	School Travel Plans	2018/ 2019	ongoing	HPBC/ DCC Staffordshire Moorlands District Council (SMDC)/Staffordshire County Council (SCC)	DCC/HPBC	No	Funded			Reduced emissions from vehicles	No of Schools Travel Plans approved & adopted	Travel plans ongoing, additional AQ focus not yet introduced	https://www.derbyshire.gov.uk/transport-roads/transport-plans/sustainable-travel/school-travel-plans/school-travel-plans.aspx
22	School based educational activities	Promoting Travel Alternatives / Public Information	Other	2018/ 2019	Not yet commenced	HPBC/ DCC SMDC/ SCC	DCC/HPBC	No	Fully Funded			Through public awareness	No of schools engaged	Not yet commenced	https://www.derbyshire.gov.uk/transport-roads/transport-plans/sustainable-travel/school-travel-plans/school-travel-plans.aspx
23	Anti-idling initiatives in educational settings	Traffic Management	Anti-idling enforcement	2018/ 2019	Not yet commenced	HPBC/ DCC SMDC/ SCC	DCC/HPBC	No	TBC			Reduced emissions from vehicles	No of schools engaged	Not yet commenced	https://www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Air-aware/Air-aware.aspx
24	Business /Workplace promotion on of Low emission vehicles	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2020	Operational	HPBC/ Energy Saving Trust	HPBC	TBC	TBC			Reduced emissions from vehicles	No of Business engaged with Energy Saving Trust	Quantitative appraisal is on-going	To make business aware of the grants available from to reduce emissions from fleet and impacts of GMCAZ
25	Business/ Workplace Travel; Planning	Promoting Travel Alternatives	Workplace Travel Planning	2018/ 2019	Operational	DCC/ HPBC	HPBC/DCC	No	TBC			Reduced emissions from vehicles	No of Business Travel Plans approved & adopted	Quantitative appraisal is on-going	https://www.derbyshire.gov.uk/transport-roads/transport-plans/sustainable-travel/sustainable-travel-and-smarter-choices.aspx
26	Encourage taxis licensed by the Council to comply with vehicle emission limits	Promoting Low Emission Transport	Taxi Licensing conditions	2022	2023	HPBC	HPBC	TBC	TBC			Reduced emissions from vehicles	Number of LEV Taxis in the fleet. All licensed taxis should meet minimum emission standard	This has been on hold whilst we awaited the outcome of National Guidance. Consultation with taxi drivers planned for 2021	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
27	Improving Cycle network - D2N2 Local Cycling and Walking Infrastructure Plan	Promoting Travel Alternatives	Workplace Travel Planning	2022	Ongoing	HPBC / DCC/Nottinghamshire County Council (NCC)	HPBC / DCC/Nottinghamshire County Council (NCC)	NO	Partially Funded			Reduced vehicle emissions	Implementation of cycle network improvements	In consultation	https://www.derbyshire.gov.uk/council/have-your-say/consultation-search/consultation-details/d2n2-local-cycling-and-walking-infrastructure-plan.aspx
28	Promotion of cycling	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			Reduced vehicle emissions	N/A	Ongoing	https://www.derbyshire.gov.uk/leisure/countryside/access/cycling/cycling.aspx
29	Public cycle hire schemes	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			Reduced vehicle emissions	No of users	Ongoing	https://www.derbyshire.gov.uk/leisure/countryside/access/cycling/cycle-hire/cycle-hire.aspx
30	Promotion of walking	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			Reduced vehicle emissions	N/A	Ongoing	https://www.derbyshire.gov.uk/leisure/countryside/access/walking/walking-for-everyone.aspx
31	Car Share Derbyshire	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			Reduced vehicle emissions	No of users	Ongoing	https://liftshare.com/uk/community/derbyshire
32	Promote use of rail – Community rail partnerships	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			Reduced vehicle emissions	N/A	Ongoing	https://www.derbyshire.gov.uk/transport-roads/public-transport/community-rail-partnerships/community-rail-partnerships.aspx
33	Construction of a railway station and the return of public trains to Gamesley Station	Alternatives to private vehicle use	Rail based park & ride	2011	Ongoing	Transport for Greater Manchester / DCC/ HPBC	Network Rail	No	Not Funded			Reduced emissions from vehicles	Rail facilities improved	Construction of a new railway station with publicly accessible trains available	Proposals is currently being considered by parliament
34	Communication initiatives, e.g. website information updates	Public Information	Other	2017/18	Operational	HPBC/ SMDC	HPBC	TBC	TBC			Through public awareness	New website	Implementation is on-going	https://www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Air-aware/Air-aware.aspx
35	Encourage / facilitate home-working	Policy Guidance and Development Control	Other policy	2022	2022	DCC/HPBC	DCC/HPBC	NO	Not Funded			Reduced vehicle emissions	No of home workers	Ongoing	Agile Working Policy Adopted
36	Review HPBC Core Strategy PolicyEQ10 Review	Policy Guidance and Development Control	Other policy	2022	EQ10 Operational Review Ongoing	HPBC	HPBC	TBC	TBC			Reduced vehicle and building emissions	New Policy Adopted	Implementation ongoing	
37	New local transport plan	Policy Guidance and Development Control	Other policy	2022	2024	DCC	DCC	TBC	TBC			Reduced emissions from vehicles	N/A	Ongoing	To Facilitate Travel Behaviour Change, The Transport Strategy Team at DCC are developing a new local transport plan, which will impact on air quality, with a consultation in Spring/ Summer of 2022 and publishing the final plan at the end of the year.
38	Review of HPBC strategies / Policies	Policy Guidance and Development Control	Other policy	2022	2024	HPBC	HPBC	TBC	TBC			Reduced vehicle and building emissions	New Policy Adopted	Review	https://www.highpeak.gov.uk/LocalPlanReview

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
39	East Midlands Air Quality Network Guidance for Developers	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018	N/A	PHE /East Midlands Councils	HPBC/ PHE /East Midlands Councils	TBC	TBC			Reduction in a range of pollutants	N/A	Establishes a range of measures expected by developers Reduction in a range of pollutants from development	To be adapted locally taken to the Planning and Health Group on completion for discussion and local adoption and implementation
40	Derbyshire Air Quality Working Group	Policy Guidance and Development Control	Derbyshire Groups Co- coordinating Area wide Strategies to reduce emissions and improve air quality	2016 onwards	Ongoing	Derby City Council/ DCC/ District Councils	HPBC Derby City Council/ DCC/ District Councils	TBC	TBC			Reduction in a range of pollutants	n/a	Work Plans / Action Plans Developed	Annual report from group taken to Health and Wellbeing Board. Annual work plan created and a ten year Derbyshire Air Quality Strategy in production
41	Raise awareness of impacts of coal and wood burning	Public Information	Regional Groups Co-ordinating programmes to develop Area-wide Strategies to reduce emissions and improve air quality	2010 onwards	Ongoing	HPBC/ Derby City Council/ DCC/ District Councils	HPBC	TBC	TBC			Reduction in a range of pollutants	N/A	Ongoing	DEFRA Leaflet now on Council websites (City and County). In addition, DCC Healthy Homes Programme continues to offer grant funding to convert coal fires to gas central heating systems.
42	Inspect under the Environmental Permit regime and enforce legislation to reduce combustion processes	Environmental Permits	Introduction/ increase of environment charges through permit systems and economic instruments	Ongoing	Continual	HPBC	HPBC/ Fees charged to Business	TBC	TBC			By restricting emissions from industrial processes	Installations adhering to permits and enforcement/penalties for breaches	Ongoing	This is standard HPBC work in Environmental Protection
43	Air quality monitoring	Public Information	Other	Ongoing	Ongoing	HPBC	HPBC	TBC	TBC			N/A	Number of monitoring locations and On-time submittal of ASRs	Ongoing annually	Possibly liaise with Defra regarding need for additional monitoring and/or AURN funding. Consider continuous monitoring and AQ grant application
44	Greater Manchester Clean Air Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2022	2026	GM	GM	TBC	TBC			Reduced NO_2 emission	Compliance with legal NO_2 limits	Ongoing	February 2022 government agreed to lift the legal direction that GM should achieve compliance with legal NO_2 limits by 2024. It has issued a new direction for compliance in the shortest possible time and by 2026 at the latest
45	Electric vehicles trial and HVO (hydrotreated veg oil) trail	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2021	2022	SMDC/HPBC	SMDC/HPBC	No	TBC			Reduced emissions from vehicles	N/A	Completed	The use of HVO (hydrotreated veg. oil) has integrated into Fleet
46	Cycle to work	Promoting Travel Alternatives	Promotion of cycling	2021	Ongoing	DCC/HPBC	DCC/HPBC	TBC	TBC			Reduced emissions from vehicles	No. of people attending the scheme	Ongoing	Cycle to work scheme relaunched, information available at: https://staff.derbyshire.gov.uk/pay-and-benefits/my-benefits-and-discounts/cycle-to-work-scheme/cycle-to-work-scheme.aspx
47	Climate Change Action Plan Launched	Policy Guidance and Development Control	Other policy	2021	2024	HPBC	HPBC	No	TBC			Reduced emissions from HPBC buildings , vehicles, operations and others	N/A	Completed	Climate Change Action Plan Launched, with a list of complimentary actions to tackle Air Quality issues https://www.highpeak.gov.uk/ClimateChange

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
															https://www.highpeak.gov.uk/media/6680/High-Peak-Climate-Change-Action-Plan/pdf/HP_Climate_change_plan.pdf?m=1626100708743 https://www.highpeak.gov.uk/media/7096/Climate-Change-Action-Plan-Part-2/pdf/HPBC_Draft_Climate_Change_Plan.pdf?m=1650632869773
48	Sustainable Travel Plan - Buxton on Move	Promoting Travel Alternatives	Personalised Travel Planning	2021	Ongoing	HPBC/Buxton Town Team	HPBC/Buxton Town Team	TBC	TBC			Reduced emissions from vehicles	N/A	Ongoing	HPBC will continue and improve engagement with local groups concern with travel around Buxton. Information available at: https://www.buxtontownteam.org/buxton-on-the-move https://www.buxtontownteam.org/files/ugd/ec6295375bd67f797247debf478f6094e50f80.pdf
49	Investigate the feasibility of implementing a CAZ in Glossop to mirror Manchester CAZ	Traffic Management	Other		Consider at a future date	HPBC/DCC	HPBC	Yes	Not Funded			N/A as this measure will not be pursued at this time	Feasibility of CAZ/LES investigated and implemented if possible	No current suitable route however working with Greater Manchester with their proposed CAZ and as such this may be looked at further	

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5 µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Efforts within High Peak are being concentrated on monitoring NO_2 levels, with a particular focus on the established AQMAs. As road traffic is often the primary source of emissions of both NO_2 and particulates, measures implemented to reduce road traffic emissions within the borough will also reduce levels of PM_{10} and $PM_{2.5}$.

HPBC is also working towards implementing new Smoke Control Zones in 2023, which will help reduce $PM_{2.5}$ levels once established. High Peak Brough Council currently has Smoke Control Orders covering the majority of Buxton and Glossop. Whilst it is recognised that improvements in the regulation of these zones will likely improve air quality within these areas, it will not significantly affect the impacts of domestic burning outside of these established zones. It has therefore been proposed that extending the current smoke control zones across the brough, in addition to the improvements in their regulation, could significantly improve emissions from domestic burning.

The extent of the proposed changes to smoke control varies from the entire borough to the restricting of the more populous towns currently not included, such as Chapel-en-le-Frith, New Mills and Whaley Bridge.

The current Defra 2022 background maps for HPBC (2018 based[7]) show that the highest concentration across the borough is predicted to be 7.04 µg/m^3 within the 1 x 1 km grid square with the centroid grid reference of 406500 381500, an area of north east Chapel-en-le-Frith, encompassing a section of the A6 Chapel Bypass. This is slightly lower than was predicted in the same area in 2021 (7.1 µg/m^3).

[7] Defra Background Mapping data for local authorities (2018-based), available online at https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

The Public Health Outcomes Framework data tool[8] compiled by Public Health England quantifies the mortality burden of $PM_{2.5}$ within England on a county and local authority scale. The 2021 fraction of mortality attributable to $PM_{2.5}$ pollution across England is 5.5%, and the fraction within HPBC is below the national average at 5.1%, as well as the East Midlands regional average of 5.6%.

LAQM.TG(22) Table A.1 Action toolbox presents a list of measures that can be implemented to help reduce concentrations of $PM_{2.5}$. Where required HPBC will review any proposed actions to be implemented with the County Council Public Health team to consider the potential impact of the actions and whether any further action is required.

[8] Public Health Outcomes Framework, Public Health England. data tool available online at https://fingertips.phe.org.uk/search/air%20quality#page/1/gid/1/pat/6/ati/501/are/E07000037/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1/page-options/ovw-do-0

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2022 by HPBC and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

HPBC has no automatic (continuous) monitoring sites within the borough. However, there is an Automatic Urban and Rural Network (AURN) national monitoring site located at Ladybower Reservoir that is within High Peak. The results of this station have been included for completeness within this ASR and raw data is available on the UK Air website.

Table A.1 in Appendix A shows the details of the automatic monitoring sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

HPBC undertook non-automatic (i.e. passive) monitoring of NO_2 at 57 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D: Map(s) of Monitoring Locations and AQMAs. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year. The annual mean NO_2 concentration was not greater than 60 µg/m^3 at any diffusion tube monitoring site during 2021. Therefore, exceedance of the 1-hour mean objective at any monitoring location within High Peak is considered unlikely.

All diffusion tube monitoring locations in HPBC had data capture rates of over 75%, therefore annualisation was not required. The NO_2 results for 2022 have been bias adjusted using a national bias adjustment factor of 0.86. Diffusion tube annualisation is further detailed in Appendix C: Diffusion Tube Bias Adjustment Factors. The analysis of the 2022 monitoring data is detailed below, and has been done in relation to the designated AQMAs in HPBC and the area of concern identified along Fairfield Road.

<u>Tintwistle AQMA</u>

Monitored concentrations are compared against the annual AQS objective in Figure A.1. In 2022, two additional diffusion tube monitoring sites were established in Tintwistle AQMA; HP62 (installed to increase coverage of AQMA 1 on the Northbound side) and HP63A,HP63B (installed near HP5 to confirm/check readings for this tube, which has consistently reported the highest result in AQMA 1). There was one reported exceedance of 42.6 µg/m^3, which was reported by HP63A,63B. It should be noted however, that following distance correction to predict annual mean concentrations at the nearest receptor, the annual mean fell to 34.2 µg/m^3, which is no longer within 10% of the AQS objective (36 µg/m^3).

Considering the new monitoring site established in 2022 reported high annual mean NO_2 concentrations, and concentrations at sites 5 and 8 have been in exceedance, or within 10% of the annual mean objective of 40 µg/m^3 in the years prior to 2020 (pre-Covid period), the AQMA is to remain in force.

Dinting Vale AQMA

Monitored concentrations are compared against the annual AQS objective in Figure A.2. One site in 2022 recorded an annual mean that was within 10% of the AQS objective: 37.6 µg/m^3 at site HP25A,25. Following distance correction however, the annual mean fell to 28.6 µg/m^3, which is no longer within 10%. 4 out of 5 monitoring sites reported decreases in annual mean NO_2 compared to 2021 data, with the only increase reported at HP25A,25B.

Whilst a general trend of reduction is observed over the past five years of data at site 21 and available four years of data at site 25 (with exception of the 2020 which was under the impact of Covid-19 pandemic), both sites have been in exceedance, or within 10% of the annual mean objective of 40 µg/m^3 in the years prior to 2020 (pre-Covid period). Therefore, the Dinting Vale AQMA is to remain in force.

Area of Concern along Fairfield Road, Buxton

Monitored concentrations are compared against the annual AQS objective in Figure A.3. Prior to distance correction, 2 sites reported exceedances of the annual mean AQS objective (45.5 µg/m^3 at site HP42A,42B and 40.7 µg/m^3 at HP44) and 2 sites reported annual means within 10% of the AQS objective (37.3 µg/m^3 at HP33A,33B and 36.8 µg/m^3 at HP41A,41B). After distance correction, there were no reported exceedances objective, but the concentrations at 3 sites remained within 10% of the AQS objective at the nearest receptor (39.3 µg/m^3 at HP44, 37.9 µg/m^3 at HP42A,42B and 36.4 µg/m^3 at HP33A, 33B).

A detailed modelling study was carried out for the area to assess the need for an additional AQMA to be declared in the area. This is provided in the Additional Appendix attached. HPBC intend to declare a new AQMA in 2023 due to high annual mean concentrations of NO_2 in this area.

Diffusion Tubes Outside of Existing and Proposed AQMAs

Monitored concentrations are compared against the annual AQS objective in Figure A.4 – Trends in NO_2 Concentrations Outside of AQMAs: Tintwistle and Hadfield, Figure A.5, Figure A.6 and Figure A.7.

There are 42 diffusion tube monitoring sites located outside of the existing and proposed AQMAs, 24 of which have been monitoring for at least five years. During 2022, HP13 recorded the lowest concentration (10.8 $\mu g/m^3$) of any of the monitoring sites located outside of the AQMAs. This site also reported the lowest concentration in 2021 (11.3 $\mu g/m^3$), The highest concentration was 30.8 $\mu g/m^3$ and was reported at HP32A,32B. There were no reported exceedances at any site, nor were any annual mean concentrations within 10% of the AQS objective.

3.2.2 Sulphur Dioxide (SO_2)

Table A.6 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2022 with the air quality objectives for SO_2. At the Ladybower AURN site, there were no recorded exceedances of any of the objectives for SO_2.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
UKA00171	Ladybower AURN	Rural	416585	389645	NO_2, O_3, SO_2	No	Chemiluminescent	N/A	N/A	4

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
HP3	95 Woodhead Road, Tintwistle	Roadside	402892	397536	NO_2	No	0.0	4.0	No	2.3
HP4	60 Woodhead Road, Tintwistle	Roadside	402828	397493	NO_2	No	0.0	2.0	No	1.9
HP5	81 Woodhead Road, Tintwistle	Roadside	402695	397442	NO_2	AQMA1 - Tintwistle	0.0	3.0	No	2.0
HP6	79 Woodhead Road, Tintwistle	Roadside	402550.3	397360	NO_2	AQMA1 - Tintwistle	0.0	4.1	No	2.5
HP8	36/38 Church Road, Tintwistle	Roadside	402243	397265	NO_2	AQMA1 - Tintwistle	0.0	1.5	No	2.4
HP10	DP at Furness Vale Primary School	Roadside	400843	383475	NO_2	No	0.0	4.1	No	2.3
HP11	DP at Dove Holes School	Roadside	407667	378235	NO_2	No	0.0	5.0	No	2.6
HP13	DP at 8 Granby Rd, Buxton	Roadside	406582	373422	NO_2	No	0.0	10.5	No	2.0
HP14	LP near Junction of Brookfield & Tavern Road, Hadfield	Roadside	401111	395391	NO_2	No	6.0	1.6	No	2.5
HP16	LP near 10 Woolley Bridge, Hadfield	Roadside	401221	395992	NO_2	No	1.0	1.5	No	2.5
HP17	Newtown traffic lights (A6) New Mills	Roadside	399411	384561	NO_2	No	2.8	2.1	No	2.7
HP20	LP near Manchester Rd / New Rd junction, Tintwistle	Kerbside	401962	397279	NO_2	AQMA1 - Tintwistle	0.9	0.9	No	2.7
HP21A, HP21B	DP at Dinting School (A57)	Roadside	402073	394337	NO_2	AQMA 2 - Dinting Vale	0.0	1.6	No	2.6
HP22A, HP22B	DP at 236 High Street West, Glossop (A57)	Roadside	402430	394221	NO_2	No	0.0	3.0	No	2.6
HP24	LP near 64 High Street East, Glossop (A57)	Roadside	403794	394089	NO_2	No	2.8	1.0	No	2.7

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
HP25a, HP25b	LP near A57 / Dinting Vale / Glossop Road (West Bound)	Kerbside	401797	394509	NO_2	AQMA 2 - Dinting Vale	2.7	0.6	No	2.5
HP26a, HP26b	LP near 72-74 Woolley Bridge, Hadfield	Roadside	401024	395675	NO_2	No	0.3	2.3	No	2.6
HP27	TP on Woolley Bridge Road near to roundabout	Roadside	400960	395819	NO_2	No	9.5	2.9	No	2.6
HP28	LP Near 411 Hadfield Road	Roadside	401269	395969	NO_2	No	2.8	2.0	No	2.6
HP29	DP at 14/16 Manchester Road, Tintwistle	Roadside	401224	396974	NO_2	No	0.0	2.4	No	2.4
HP30	LP near Junction Manchester Road & Matthew Close, Tintwistle	Roadside	401641	397241	NO_2	No	3.1	2.3	No	2.6
HP31	58 Manchester Road, Tintwistle	Roadside	401875	397260	NO_2	No	0.4	1.0	No	2.6
HP32A, HP32B	LP near 37/39 Buxton Road, Bridgemont	Roadside	401200	382565	NO_2	No	2.1	1.4	No	2.5
HP33A, HP33B	LP near 135 Fairfield Road	Roadside	406600	373951	NO_2	No	0.4	2.7	No	2.6
HP34	TP near 27/29 Buxton Road, Dove Holes	Roadside	407543	377757	NO_2	No	0.8	1.9	No	2.6
HP35	TP near 85 Hallsteads, Dove Holes	Roadside	407678	378329	NO_2	No	0.4	2.6	No	2.6
HP36	LP near War memorial, Buxton Road, Furness Vale	Roadside	400739	383533	NO_2	No	9.4	1.9	No	2.3
HP37	LP near 81 Buxton Road, Furness Vale	Roadside	400679	383627	NO_2	No	2.5	2.3	No	2.8
HP38	LP near 84 Buxton Road, New Town	Roadside	399681	384577	NO_2	No	2.4	1.6	No	2.6
HP39	LP near 79 Buxton Road, New Town	Roadside	399713	384580	NO_2	No	3.4	2.1	No	2.7

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
HP41A, HP41B	LP near 29 Fairfield, Buxton (SB)	Roadside	406405	373760	NO_2	No	0.4	2.0	No	2.8
HP42A, HP42B	LP near 50 Fairfield, Buxton (NB)	Roadside	406402	373898	NO_2	No	3.1	2.2	No	2.6
HP43	101 Fairfield (SB)	Roadside	406451	373920	NO_2	No	3.9	1.4	No	2.5
HP44	Bulls Head Fairfield NB	Roadside	406607	373973	NO_2	No	0.4	1.6	No	2.7
HP45	117 Buxton Road Whaley Bridge NB	Roadside	401082	380736	NO_2	No	0.4	2.9	No	2.8
HP46	Whaley Bridge Primary School NB	Roadside	401107	381054	NO_2	No	8.0	4.5	No	2.6
HP47	Charlesworth; G&D	Roadside	400526	392905	NO_2	No	0.0	1.1	No	2.6
HP48	Hadfield - Park Road	Roadside	402442	395858	NO_2	No	2.4	1.9	No	2.3
HP49	Hadfield - Hadfield Road (L2)	Roadside	401932	395946	NO_2	No	2.7	2.1	No	2.5
HP50	Buxton - London Road	Roadside	405959	372781	NO_2	No	0.4	2.5	No	2.6
HP51	LP near 21/25 Dinting Vale, A57	Roadside	402076	394319	NO_2	AQMA 2 - Dinting Vale	0.4	2.1	No	2.4
HP52	TP near 9 Dinting Vale, A57	Roadside	402127	394270	NO_2	AQMA 2 - Dinting Vale	2.4	2.2	No	2.2
HP53	LP near 6 Dinting Vale	Kerbside	402145	394271	NO_2	AQMA 2 - Dinting Vale	4.0	0.5	No	2.3
HP54	LP near 31 Church Road, New Mills	Roadside	400302	385253	NO_2	No	3.2	1.4	No	2.5
HP55	LP near 28 Church Road, New Mills	Roadside	400323	385276	NO_2	No	3.5	1.0	No	2.5
HP56	LP near 202/204 Albion Road, Newtown	Roadside	399440	384641	NO_2	No	3.0	2.1	No	2.3
HP57	TP near 26 Hernstone Lane, Peak Forest	Roadside	411647	379093	NO_2	No	4.0	1.5	No	2.2

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
HP58	LP near Peak Forest C of E Primary School	Roadside	411389	379251	NO_2	No	6.2	2.1	No	2.2
HP59	SP on A6013 near Sickleholme Garage	Kerbside	420767	382376	NO_2	No	21.5	0.3	No	2.2
HP60	Dove Holes - Hallsteads (L2) NB	Roadside	407615	378089	NO_2	No	1.2	3.0	No	2.2
HP61	Glossop - High Street West, Glossop (A57) (L3) EB	Roadside	403403.8	394072	NO_2	No	0.0	6.6	No	2.5
HP62	Tintwistle - Woodhead Road & Bank Row (L5) EB	Roadside	402228	397274	NO_2	AQMA1 - Tintwistle	1.0	1.5	No	2.4
HP63A, HP63B	Tintwistle - Woodhead Road (L6) EB	Roadside	402705	397444	NO_2	AQMA1 - Tintwistle	2.7	1.2	No	2.5
HP64	Buxton - Spring Gardens NB	Roadside	406314	373597	NO_2	No	2.0	1.5	No	2.4
HP65	Buxton - Fairfield Road, Brooklyn Place NB	Roadside	406340	373595	NO_2	No	4.6	2.3	No	2.5
HP66	Buxton - High Street, 5-Ways NB	Roadside	405767	372970	NO_2	No	2.0	0.1	No	2.5
HP67	Buxton - Dale Road, 5-Ways EB	Roadside	405813	372942	NO_2	No	1.9	2.9	No	2.6

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
UKA00171	416585	389645	Rural	97.6	97.6	5.7	6.1	4.6	4.7	5.2

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction.**

Notes:

The annual mean concentrations are presented as $\mu g/m^3$.

Exceedances of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**.

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
HP3	402892	397536	Roadside	90.4	90.4	28.7	25.7	18.2	20.2	20.2
HP4	402828	397493	Roadside	100	100.0	27.7	32.6	28.1	23.0	23.2
HP5	402695	397442	Roadside	92.0	92.1	**47.0**	37.4	20.3	32.9	35.2
HP6	402550.3	397360	Roadside	92.3	92.3	32.8	30.0	19.7	26.5	26.0
HP8	402243	397265	Roadside	100	100.0	39.3	35.5	24.8	30.6	27.8
HP10	400843	383475	Roadside	100	100.0	27.5	25.8	19.1	21.1	20.6
HP11	407667	378235	Roadside	92.3	92.3	21.6	20.5	15.5	15.9	17.7
HP13	406582	373422	Roadside	90.4	90.4	13.8	13.8	10.8	11.3	10.8
HP14	401111	395391	Roadside	100	100.0	24.1	23.0	18.3	18.7	19.8
HP16	401221	395992	Roadside	100	100.0	25.8	23.9	18.3	19.7	19.8
HP17	399411	384561	Roadside	100	100.0	32.6	31.4	23.2	26.2	25.3
HP20	401962	397279	Kerbside	84.7	84.7	28.4	26.3	19.4	30.5	28.2
HP21A, HP21B	402073	394337	Roadside	100	100.0	**41.3**	38.9	29.3	32.4	29.8
HP22A, HP22B	402430	394221	Roadside	100	100.0	33.6	31.3	24.7	26.4	25.7
HP24	403794	394089	Roadside	100	100.0	29.8	29.4	22.9	23.6	22.5
HP25a, HP25b	401797	394509	Kerbside	100	100.0	**53.6**	**46.3**	36.1	36.6	37.6
HP26a, HP26b	401024	395675	Roadside	100	100.0	34.5	30.8	23.3	26.7	25.1
HP27	400960	395819	Roadside	100	100.0	32.7	33.8	24.4	27.0	27.2
HP28	401269	395969	Roadside	90.4	90.4	23.0	21.6	18.5	18.4	18.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
HP29	401224	396974	Roadside	90.4	90.4	30.7	27.3	18.8	21.3	22.5
HP30	401641	397241	Roadside	100	100.0	28.3	27.3	19.4	20.2	21.3
HP31	401875	397260	Roadside	100	100.0	37.8	35.9	24.9	27.6	28.5
HP32A, HP32B	401200	382565	Roadside	100	100.0	**40.3**	38.6	28.8	31.6	30.8
HP33A, HP33B	406600	373951	Roadside	100	100.0	**48.2**	**45.4**	33.8	39.1	37.3
HP34	407543	377757	Roadside	90.4	90.4	23.6	26.3	21.6	24.7	25.3
HP35	407678	378329	Roadside	100	100.0	29.0	29.2	22.5	25.9	23.6
HP36	400739	383533	Roadside	100	100.0	32.3	30.8	23.6	27.1	27.2
HP37	400679	383627	Roadside	100	100.0	25.3	27.3	21.4	22.2	22.7
HP38	399681	384577	Roadside	100	100.0	27.4	33.3	23.2	24.6	26.0
HP39	399713	384580	Roadside	100	100.0	23.0	23.5	17.5	19.1	19.1
HP41A, HP41B	406405	373760	Roadside	92.9	92.9		**44.4**	34.1	35.4	36.8
HP42A, HP42B	406402	373898	Roadside	100	100.0		**50.3**	36.5	**43.7**	**45.5**
HP43	406451	373920	Roadside	100	100.0		34.0	26.5	27.3	29.6
HP44	406607	373973	Roadside	92.3	92.3		36.2	30.6	36.6	**40.7**
HP45	401082	380736	Roadside	92.3	92.3		28.5	22.6	23.1	23.8
HP46	401107	381054	Roadside	100	100.0		20.8	14.7	15.6	15.6
HP47	400526	392905	Roadside	100	100.0		32.2	24.1	28.2	26.9
HP48	402442	395858	Roadside	100	100.0			22.5	22.9	23.1
HP49	401932	395946	Roadside	100	100.0			15.5	16.4	16.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
HP50	405959	372781	Roadside	82.7	82.7			21.3	23.7	24.5
HP51	402076	394319	Roadside	100	100.0				29.8	29.3
HP52	402127	394270	Roadside	82.5	82.5				26.0	25.1
HP53	402145	394271	Kerbside	100	100.0				33.2	32.2
HP54	400302	385253	Roadside	90.4	90.4				23.6	23.2
HP55	400323	385276	Roadside	92.1	92.1				21.7	21.3
HP56	399440	384641	Roadside	100	100.0				24.1	25.3
HP57	411647	379093	Roadside	90.4	90.4				18.3	18.1
HP58	411389	379251	Roadside	100	100.0				24.2	22.6
HP59	420767	382376	Kerbside	100	100.0				16.3	18.3
HP60	407615	378089	Roadside	100	84.4					24.3
HP61	403403.8	394072	Roadside	90.1	84.4					16.6
HP62	402228	397274	Roadside	100	92.1					31.6
HP63A, HP63B	402705	397444	Roadside	100	92.1					**42.7**
HP64	406314	373597	Roadside	100	92.1					27.1
HP65	406340	373595	Roadside	100	92.1					26.2
HP66	405767	372970	Roadside	100	92.1					25.8
HP67	405813	372942	Roadside	100	92.1					23.0

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Diffusion tube data has been bias adjusted.**

☒ **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **<u>bold and underlined</u>**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1 – Trends in Annual Mean NO_2 Concentrations: Tintwistle AQMA

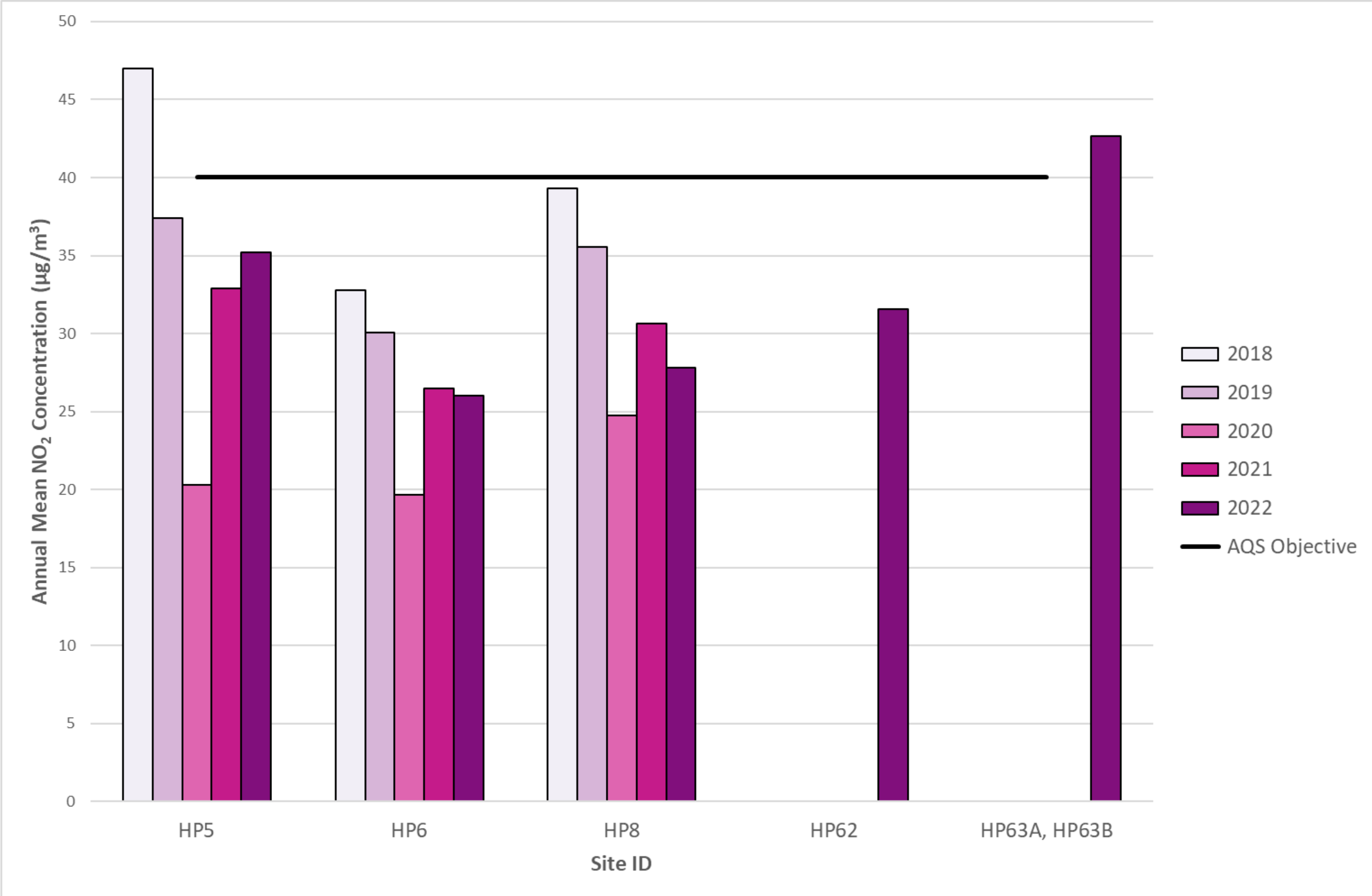


Figure A.2 – Trends in Annual Mean NO_2 Concentrations: Dinting Vale AQMA

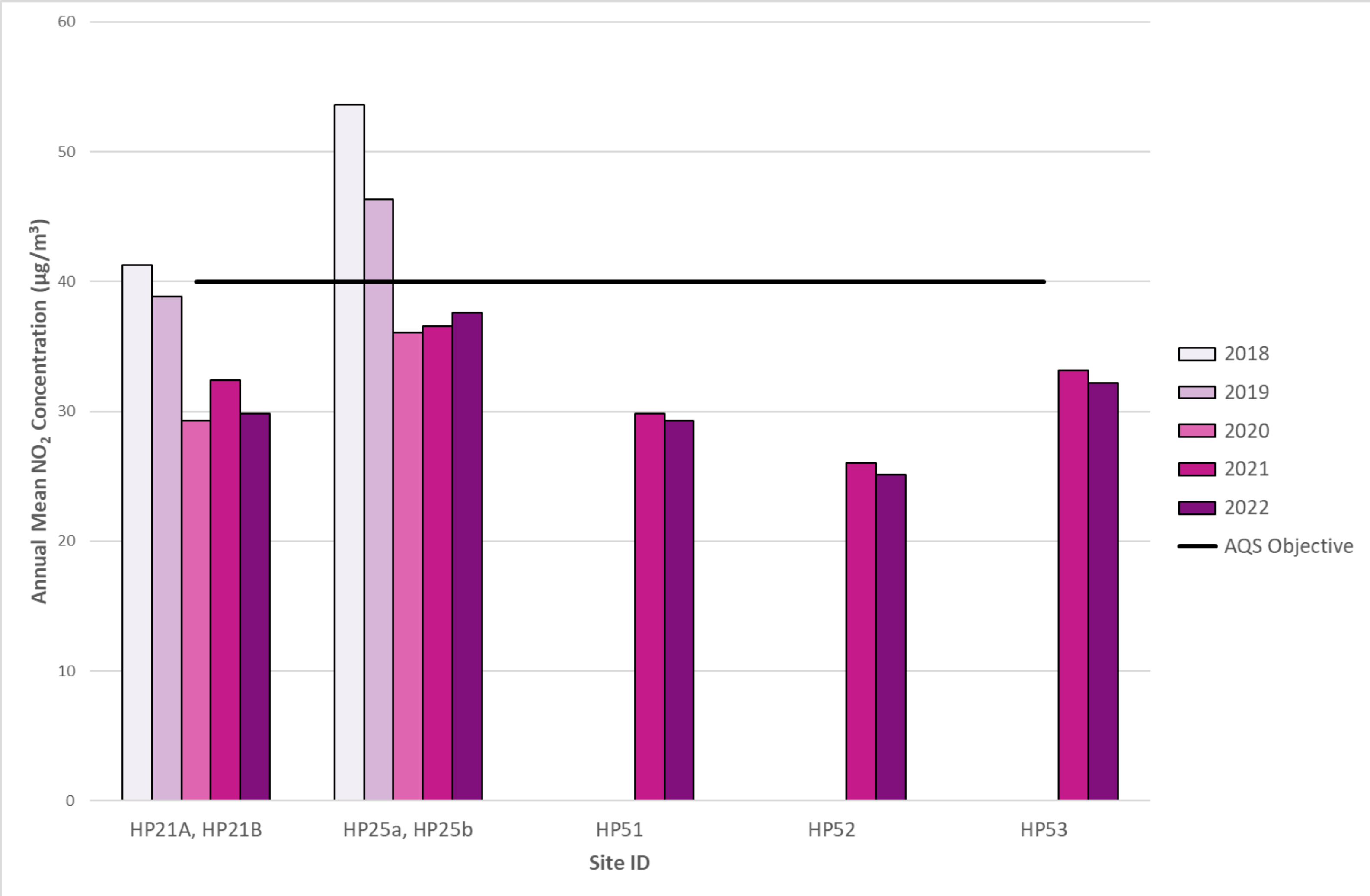


Figure A.3 – Trends in Annual Mean NO_2 Concentrations at Sites within Area of Concern (Fairfield Road)

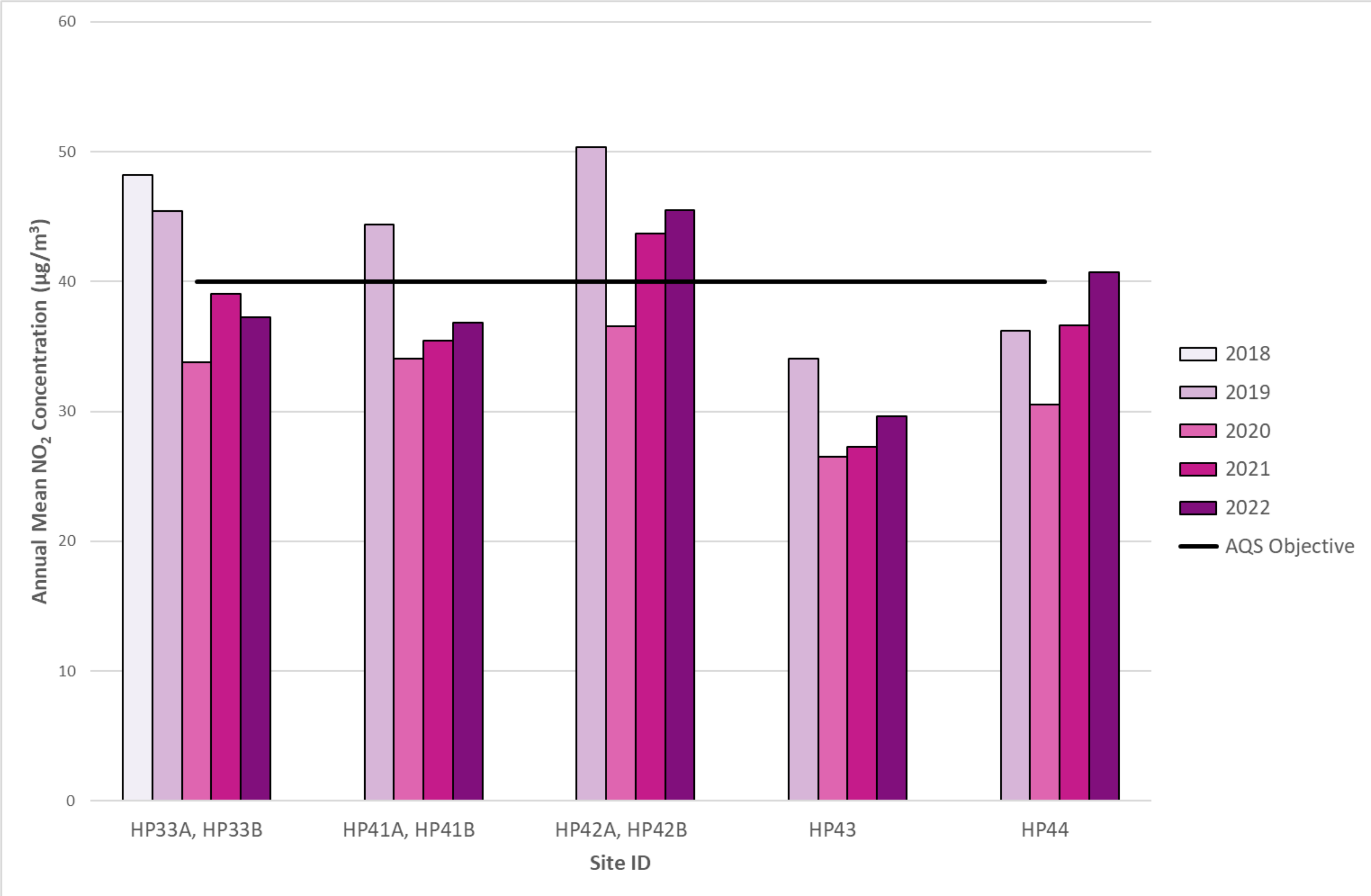


Figure A.4 – Trends in NO_2 Concentrations Outside of AQMAs: Tintwistle and Hadfield

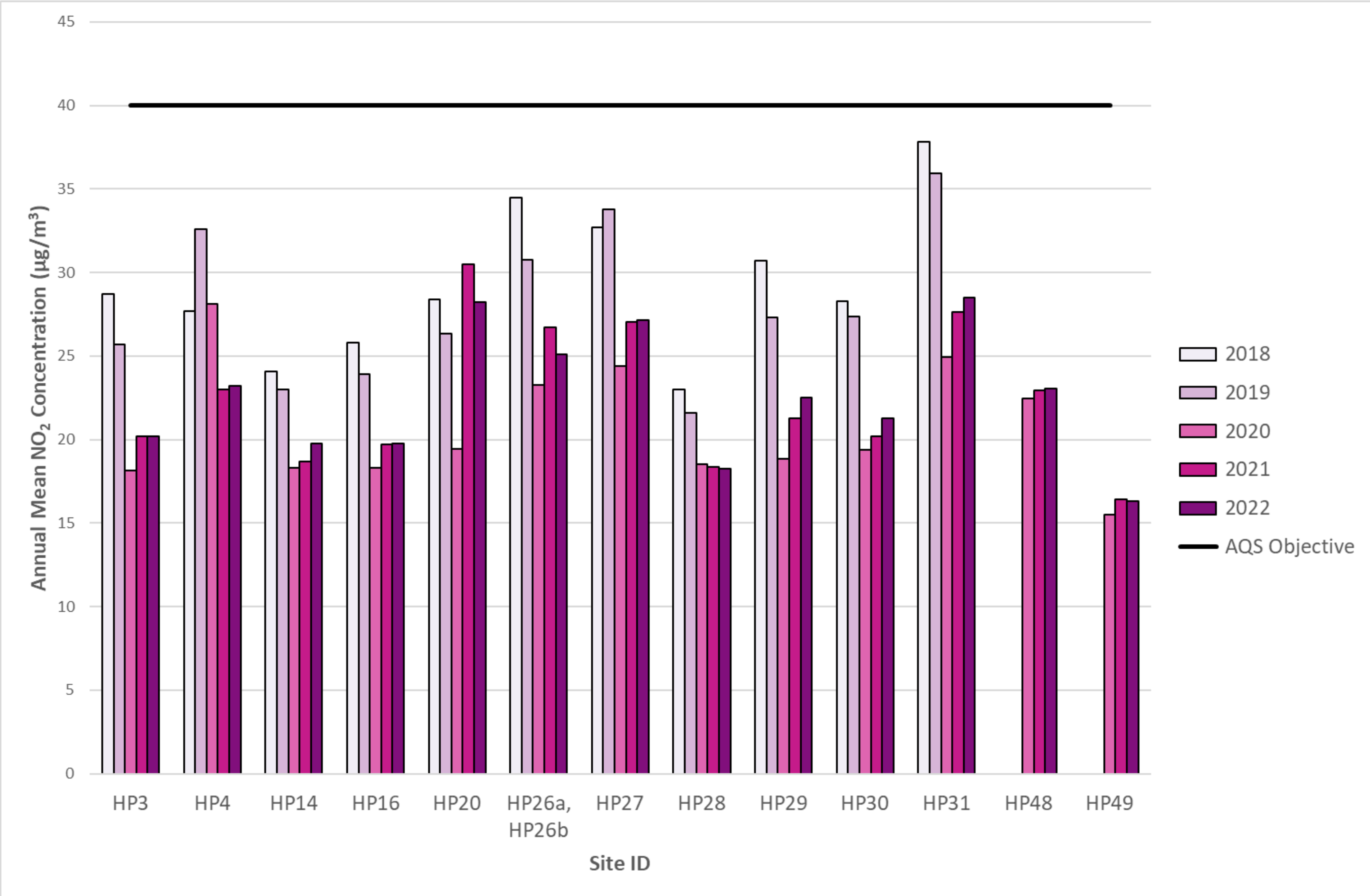


Figure A.5 – Trends in NO_2 Concentrations Outside of AQMAs: Buxton, Charlesworth and Glossop

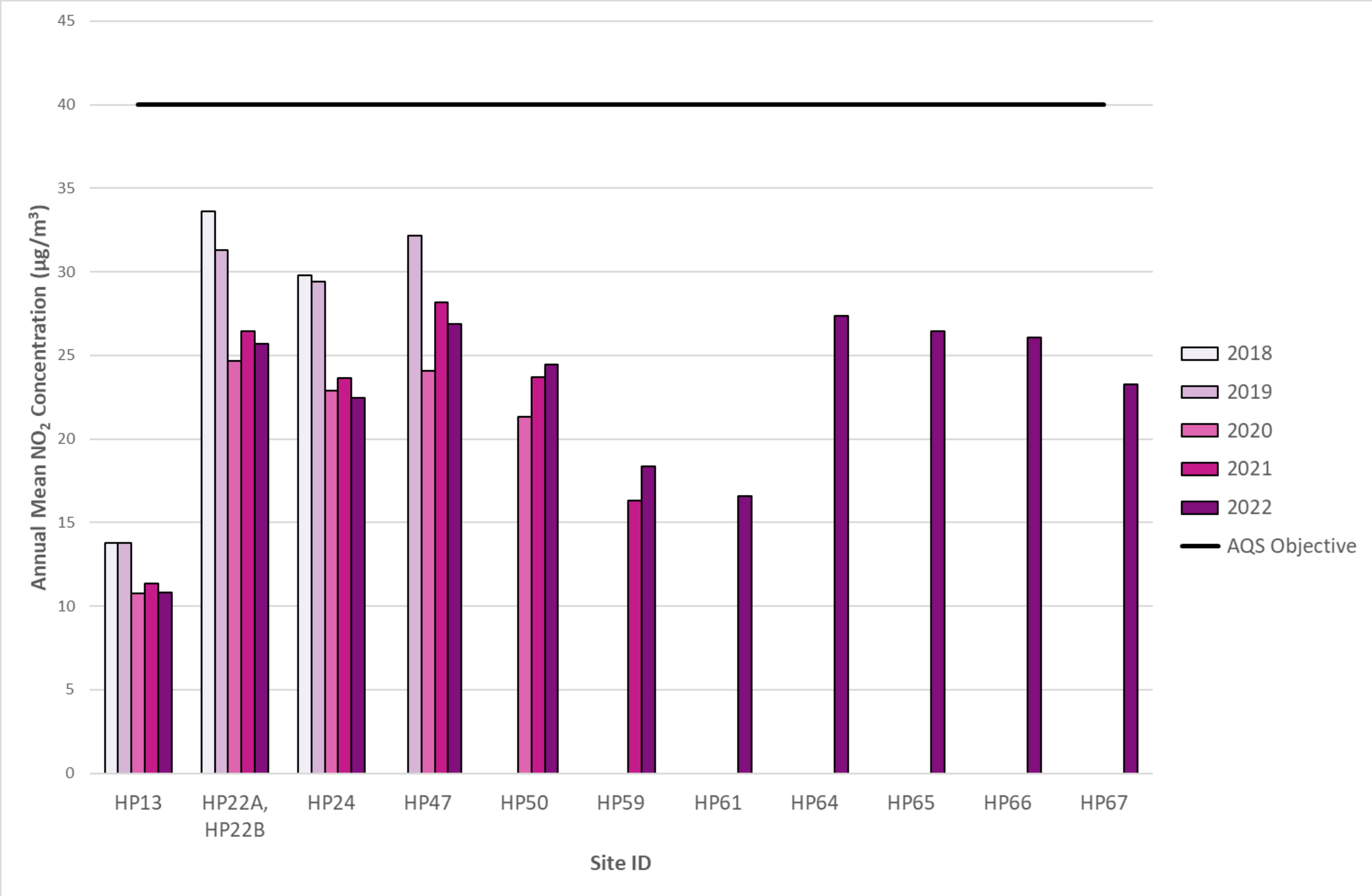


Figure A.6 – Trends in NO_2 Concentrations outside of AQMAs: Bridgemont, Furness Vale, New Mills, New Town and Whaley Bridge

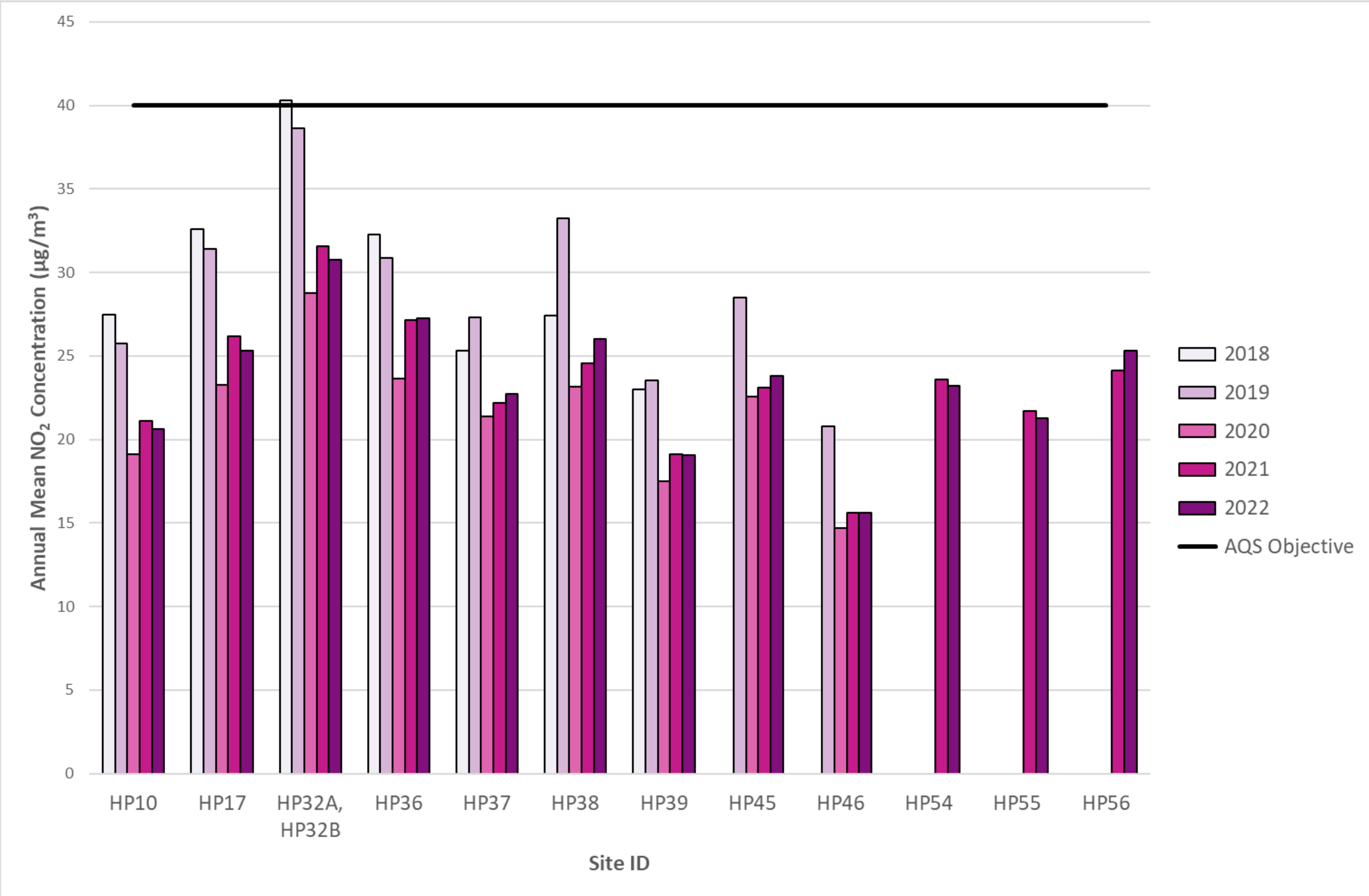


Figure A.7 – Trends in NO_2 Concentrations outside of AQMAs: Dove Holes and Peak Forest

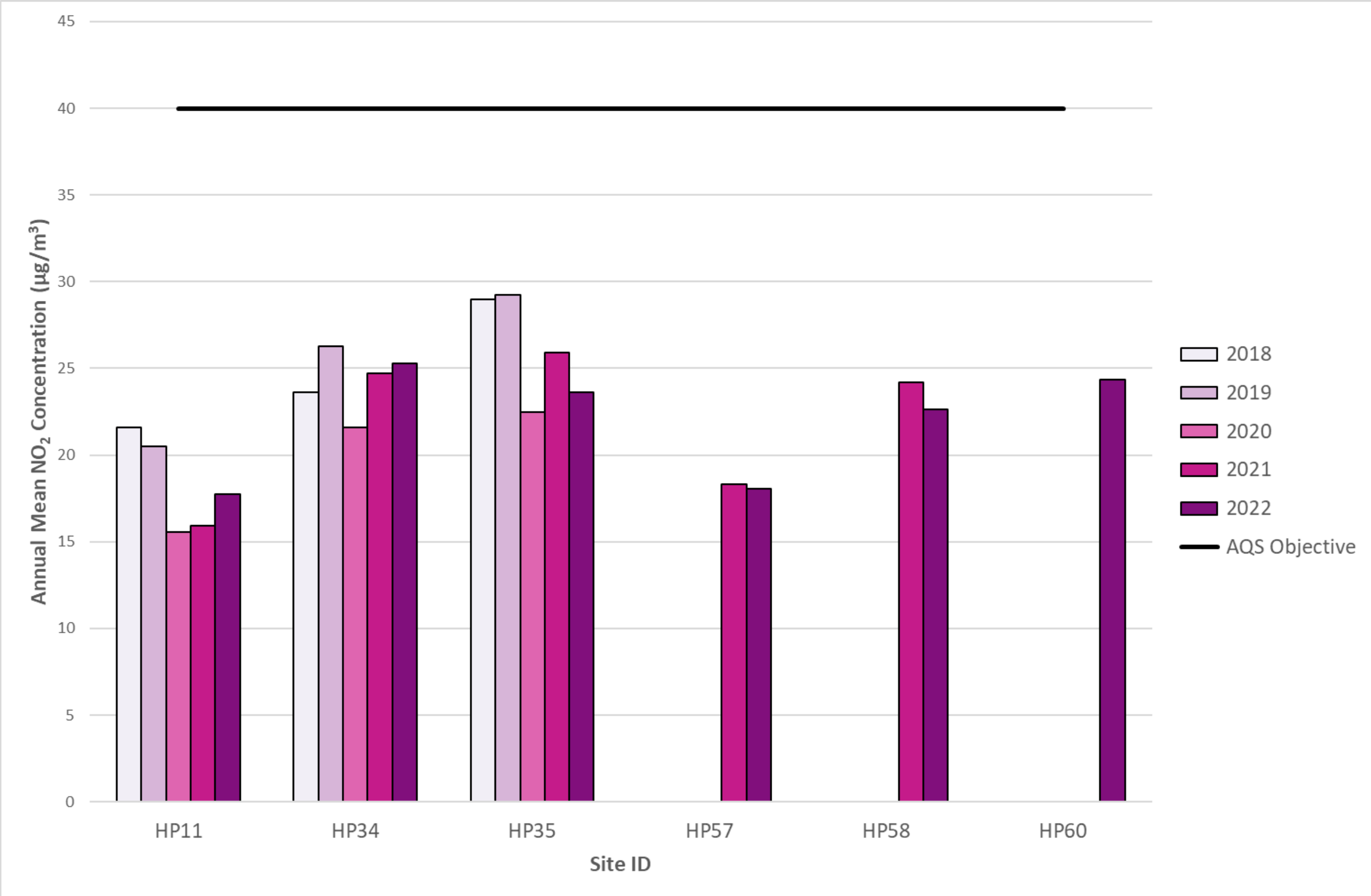


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
UKA00171	416585	389645	Rural	97.6	97.6	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.6 – SO_2 2022 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	Number of 15-minute Means > 266µg/m^3	Number of 1-hour Means > 350µg/m^3	Number of 24-hour Means > 125µg/m^3
UKA00171	416585	389645	Rural	98.0, 99.1, 99.2	98.0, 99.1, 99.2	0	0	0

Notes:

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
HP3	402892	397536	30.9	20.3	20.6	20.7	21.3	19.3	23.7	27.4	25.0		24.8	24.1	23.5	20.2		
HP4	402828	397493	33.4	25.1	25.9	19.3	25.9	26.0	26.8	29.1	25.9	28.2	30.1	28.5	27.0	23.2		
HP5	402695	397442		32.6	33.8	35.7	39.1	42.1	44.4	44.8	39.2	48.6	44.5	45.4	**40.9**	35.2		
HP6	402550	397360	41.2	31.0	26.7	28.4	31.3	29.5	30.7	31.0	31.6	27.5		23.9	30.3	26.0		
HP8	402243	397265	34.2	33.5	31.0	26.4	27.9	30.6	32.0	33.7	31.9	34.5	35.2	37.3	32.4	27.8		
HP10	400843	383475	34.6	21.3	23.8	20.9	21.8	18.7	22.4	25.6	27.0	22.3	23.7	25.7	24.0	20.6		
HP11	407667	378235	21.7		26.2	19.9	15.6	16.6	17.9	21.8	21.5	22.9	20.8	22.0	20.6	17.7		
HP13	406582	373422	18.5	9.0	18.5	13.3	9.9	8.1	9.5	12.2	12.2	11.1	16.0		12.6	10.8		
HP14	401111	395391	35.5	23.1	23.2	18.1	20.0	20.5	20.4	22.2	20.7	21.0	25.4	25.7	23.0	19.8		
HP16	401221	395992	34.5	21.6	20.8	20.3	18.9	18.2	19.5	21.8	24.1	20.9	26.6	28.5	23.0	19.8		
HP17	399411	384561	32.6	23.1	30.5	32.8	25.4	25.4	28.3	33.8	36.1	23.5	29.0	33.1	29.5	25.3		
HP20	401962	397279	36.1		22.6	19.0	20.3	79.7	38.2	21.5	21.5	22.4		46.7	32.8	28.2		
HP21A, HP21B	402073	394337	50.0	34.3	35.9	31.1	29.3	29.1	32.7	34.5	36.5	31.2	36.2	36.1	34.7	29.8		
HP22A, HP22B	402430	394221	39.9	28.5	30.0	24.7	24.2	24.1	27.6	30.7	31.2	28.0	33.5	36.9	29.9	25.7		
HP24	403794	394089	35.1	26.4	21.7	23.6	21.9	21.6	26.4	28.9	27.0	22.1	28.3	30.7	26.1	22.5		
HP25a, HP25b	401797	394509	46.7	45.9	42.1	36.6	38.7	39.2	44.6	44.4	44.9	42.0	52.5	47.0	**43.7**	37.6	28.6	
HP26a, HP26b	401024	395675	37.7	25.1	30.7	26.9	24.5	25.3	28.8	32.3	31.3	25.3	31.7	31.4	29.2	25.1		
HP27	400960	395819	41.2	33.1	33.6	24.4	29.1	30.0	31.0	28.8	25.9	31.5	35.9	34.5	31.6	27.2		
HP28	401269	395969	27.5	25.7	22.8	18.1	18.6	17.6	20.4	19.1	19.4	19.5	24.9		21.2	18.3		
HP29	401224	396974	31.8	27.3	23.5		25.5	23.0	23.8	27.9	24.3	26.9	30.3	23.8	26.2	22.5		
HP30	401641	397241	34.6	22.8	23.0	20.9	21.8	20.7	23.2	24.7	21.7	26.4	26.5	30.3	24.7	21.3		
HP31	401875	397260	45.9	29.4	26.4	24.3	32.8	28.3	33.2	35.8	33.6	34.8	37.8	35.0	33.1	28.5		
HP32A, HP32B	401200	382565	37.4	29.1	35.0	34.7	34.7	34.1	36.9	42.4	41.8	35.2	35.8	32.8	35.8	30.8		
HP33A, HP33B	406600	373951	37.4	32.7	43.2	41.9	43.3	39.1	46.4	49.5	46.8	43.9	51.9	44.3	**43.3**	37.3	36.4	
HP34	407543	377757	18.2	18.8	35.9	32.6	24.4	27.8	30.3	37.4	35.1	29.2	33.5		29.4	25.3		
HP35	407678	378329	30.8	16.1	38.8	27.2	27.2	26.0	25.6	28.9	27.5	22.4	31.6	27.7	27.5	23.6		
HP36	400739	383533	31.9	24.3	34.1	27.7	29.5	28.6	33.2	35.0	35.7	33.0	33.0	34.2	31.7	27.2		
HP37	400679	383627	38.5	20.0	27.7	21.3	23.3	22.8	23.3	25.8	29.3	27.8	28.8	28.4	26.4	22.7		

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
HP38	399681	384577	42.4	27.5	27.6	27.7	26.5	29.0	29.2	32.7	33.7	27.1	29.4	30.5	30.3	26.0		
HP39	399713	384580	34.9	19.0	25.2	20.1	17.7	17.8	19.8	23.0	24.6	17.5	20.7	26.0	22.2	19.1		
HP41A, HP41B	406405	373760	39.6	30.4	50.0	46.0	41.6	37.3		55.6	51.6	39.1	42.2	38.1	**42.8**	36.8	35.8	
HP42A, HP42B	406402	373898	52.8	36.9	49.6	49.6	49.3	55.9	60.6	60.0	60.4	49.1	57.1	53.8	**52.9**	45.5	37.9	
HP43	406451	373920	28.3	29.7	45.5	34.9	31.5	31.0	32.2	37.2	36.7	32.4	40.9	32.6	34.4	29.6		
HP44	406607	373973	40.8		38.3	37.7	36.3	32.3	45.3	42.8	55.6	62.2	91.2	37.9	**47.3**	**40.7**	39.3	
HP45	401082	380736	37.1	26.6	31.0	24.1	23.2	22.8	24.5	26.9		25.9	30.8	31.4	27.7	23.8		
HP46	401107	381054	23.2	15.9	23.5	19.4	13.6	8.4	14.5	16.3	18.3	18.7	21.1	24.8	18.1	15.6		
HP47	400526	392905	42.5	18.2	26.8	38.4	29.8	27.7	26.7	36.2	35.6	23.9	29.3	40.2	31.3	26.9		
HP48	402442	395858	21.8	23.6	24.2	21.9	28.5	28.4	29.5	29.9	29.0	25.6	32.3	27.0	26.8	23.1		
HP49	401932	395946	34.6	19.4	17.3	13.7	15.5	14.1	15.6	15.8	17.8	17.4	21.2	25.1	19.0	16.3		
HP50	405959	372781	29.6		35.7	30.5		24.0	26.3	23.4	32.7	21.2	32.5	28.7	28.5	24.5		
HP51	402076	394319	45.9	36.1	36.3	29.2	30.7	29.1	31.5	30.8	32.9	29.9	41.4	34.8	34.1	29.3		
HP52	402127	394270		37.0	32.9		27.4	21.2	23.2	20.4	24.6	29.5	37.6	38.4	29.2	25.1		
HP53	402145	394271	47.0	32.4	38.9	30.1	32.5	31.7	38.3	37.0	36.8	36.7	47.5	39.9	37.4	32.2		
HP54	400302	385253	32.4	25.2	31.7		23.5	21.3	24.6	28.0	27.6	25.9	27.1	29.7	27.0	23.2		
HP55	400323	385276		24.6	25.3	22.8	21.8	24.4	23.6	26.7	27.0	22.1	25.2	28.4	24.7	21.3		
HP56	399440	384641	34.5	25.8	30.4	25.8	26.7	28.1	28.8	31.2	30.8	28.7	29.9	32.3	29.4	25.3		
HP57	411647	379093	24.9	16.0	22.0	19.2	20.1	19.2	21.8	23.6	22.3	20.1	21.9		21.0	18.1		
HP58	411389	379251	30.5	16.4	26.9	26.7	28.8	26.9	30.6	31.3	26.0	22.7	24.9	23.8	26.3	22.6		
HP59	420767	382376	26.5	19.3	27.3	21.8	20.8	16.7	19.5	23.8	22.3	17.4	20.0	20.5	21.3	18.3		
HP60	407615	378089			31.5	28.3	23.4	23.8	28.4	32.5	27.7	28.7	29.8	29.0	28.3	24.3		
HP61	403404	394072		20.0	20.4	17.0	17.7	16.8	19.0	18.7		17.2	22.0	24.0	19.3	16.6		
HP62	402228	397274		37.5	33.5	32.2	36.7	36.1	39.5	43.7	36.5	36.9	37.6	33.5	36.7	31.6		
HP63A, HP63B	402705	397444		46.7	38.5	42.2	46.3	52.9	58.3	62.0	51.8	49.9	52.6	45.0	**49.6**	**42.7**	34.2	
HP64	406314	373597		22.0	33.9	31.1	29.1	30.5	32.4	39.5	35.0	27.6	32.6	32.4	31.5	27.1		
HP65	406341	373595		22.7	32.2	28.7	25.6	27.3	31.6	37.2	31.5	29.7	32.9	35.3	30.4	26.2		
HP66	405767	372970		23.7	32.8	28.7	24.8	29.3	31.1	33.6	31.0	28.0	33.4	33.5	30.0	25.8		
HP67	405813	372942		26.1	26.9	27.1	25.8	24.9	25.8	31.4	31.2	22.0	25.8	26.9	26.7	23.0		

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column.**

☒ **HPBC confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **<u>bold and underlined</u>**.

See Appendix C for details on bias adjustment and annualisation.

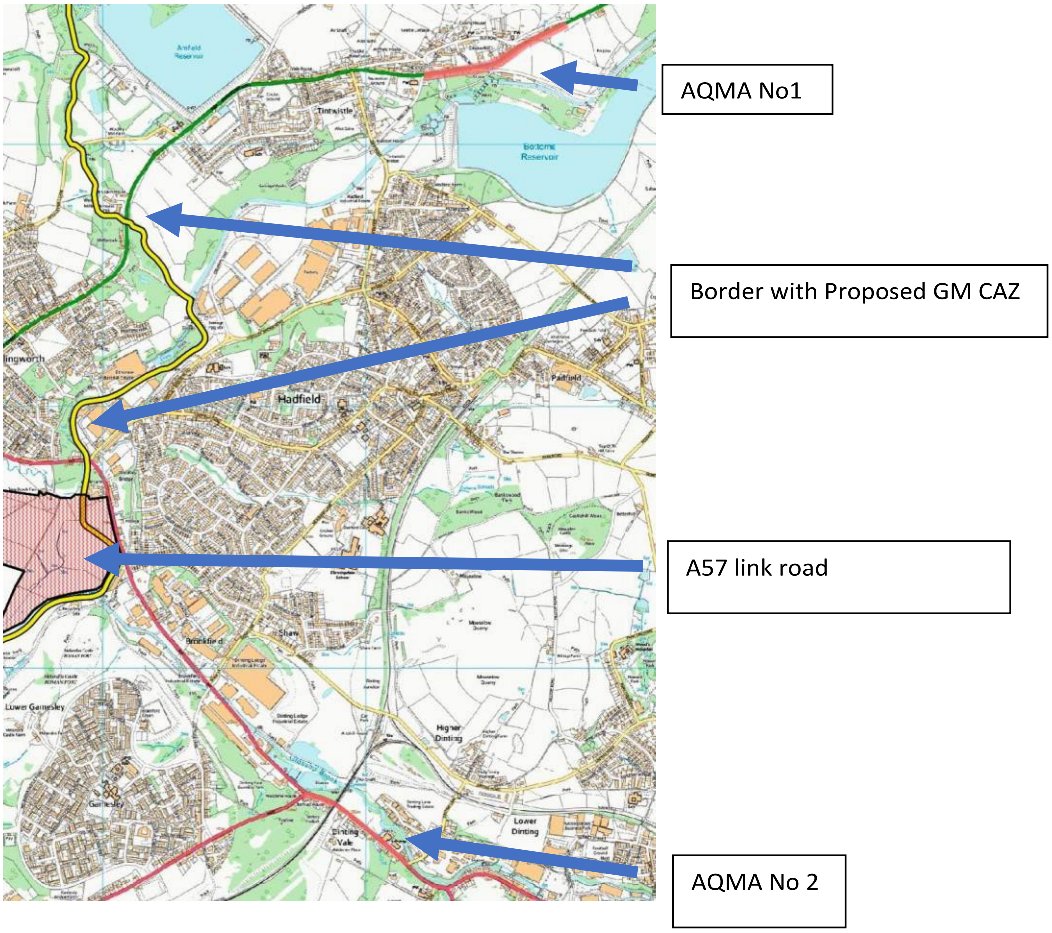
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

New or Changed Sources Identified Within High Peak Borough Council During 2022

Trans-Pennine Upgrade/A57 Link Road project

The proposed A57 Link Roads scheme, development consent order (DCO), which includes the A5/A628 Mottram Bypass and the A57(T) to A57 Link Roads was approved by the secretary of state on 16th November 2022 (with modifications). The proposed location of A57 link Road (and GM _ CAZ) is shown in Figure C.1 below.

Figure C.1 Proposed location of A57 link Road (and GM _ CAZ)



Full details of the proposed A57 link road can be found here:
https://highwaysengland.co.uk/our-work/north-west/a57-trans-pennine-upgrade/

Full details and documents relating to the DCO examination can be found here:

https://infrastructure.planninginspectorate.gov.uk/projects/north-west/a57-link-roads-previously-known-as-trans-pennine-upgrade-programme/

Summary of the DCO examination and Air Quality

The key documents submitted by the national Highways National Highways with regard to Air Quality impacts of the proposed scheme can be found here:

- Environmental Statement - Chapter 5 - Air Quality
- Appendix 5.5 Air Quality Model Results
- Figure 5.2i - Air Quality Model Sensitive Receptors
- Figure 5.4 - Air Quality EU Compliance Risk
- Figure 5.2ii - Air Quality Model Sensitive Receptors
- Appendix 5.2 - Air Quality Legislation and Policy
- Appendix 5.4 - Air Quality Baseline
- Appendix 8.4 - Assessment of Likely Significant Air Quality on Designated Habitats
- Appendix 5.3 - Further Details on Air Quality Modelling
- Figure 5.1 - Air Quality Constraints Map

Several queries were raised by HPBC, with regard to aspects of the submitted assessment. An overview of some of these queries can be found in the local impact report, jointly prepared and submitted by HPBC & DCC, to the planning inspectorate as part of the examination.

The examination formally began on 17th November 2021 and continued through to 17th May 2022. Discussions with National Highways and the inspectorate continued throughout this period, copies of these discussions can these can be found here. The primary disagreement between the two bodies focused on the National Highways decision not to assess the schemes impacts on HPBC's 2 AQMAs.

National Highways justification for this was that the traffic modelling indicated that the increase in flows through both AQMAs was below the threshold to trigger assessments and so were screened out. In the case of Dinting Vale, this was in spite of large increases in traffic using the A57 either side of the AQMA and Glossop town centre post opening. National Highways modelling indicated that traffic would effectively bypass the A57 through Glossop town centre as it would be at capacity and re-route via Shaw Lane, Dinting Road and Norfolk Street.

HPBC queried the traffic modelling used to screen out the AQMA's and considered it to be either implausible given the residential nature of the alternative route (and would therefore underestimate traffic through the AQMA), or if the model was correct, such a diversion would be undesirable to communities in the vicinity.

*In his decision, the Secretary of State (SoS) acknowledged these concerns and acknowledge that "more traffic might use Glossop High Street than predicted and alter the balance of benefits and disbenefits between the alternative routes and the A57". However, they are "satisfied that the overall traffic flows, resultant congestion and journey times as modelled provide a reasonable basis for assessing the Proposed Development"

Nevertheless, in recognition of the "uncertainties in traffic modelling and potential for materially new or materially different adverse effects from those identified in the ES", an additional requirement for National Highways has been included for the monitoring of air quality in the Tintwistle and Glossop/Dinting Vale AQMAs together with mitigation measures to mitigate any "exceedances of air quality limit values reasonably attributable to the operation of the Proposed Development all to be agreed with the Secretary of State in consultation with the relevant planning authority".

HPBC have yet to receive any information from the National Highways authority regarding any proposals to address the requirements of the DCO consent for the monitoring of air quality in the Tintwistle and Glossop/Dinting Vale AQMAs but it is hoped that this will be addressed soon.

The construction of the road was due to commence in the Spring of 2023, however, a legal challenge has been made against the Secretary of State's decision to grant a Development Consent Order (DCO) for the A57 Link Roads scheme. Construction has thus been delayed until this matter has been resolved, which may have contributed to the lack of feedback from National Highways on the required air quality monitoring.

Greater Manchester Clean Air Zone

Glossop and Tintwistle share a large border with Tameside Metropolitan Borough Council, which is part of the Greater Manchester (GM). Authorities. GM authorities have received a direction from Government to introduce a Clean Air Plan to bring NO_2 levels within legal limits in "the shortest possible time".

It was initially proposed to introduce charging Clean Air Zone (CAZ) Category C, across the whole of the GM region and during 2021, work started on implementing the scheme, and Clean Air Zone signs were placed along all the main routes in HPBC district (A57, A628 and A6) into Greater Manchester.

However, in December 2021 GM Authorities wrote to central government noting that the original proposal for a charging CAZ was unworkable and would not meet the obligations in the direction to achieve compliance with the legal limit for harmful NO_2 air pollution by 2024 and could have caused significant financial hardship for people affected.

In February 2022 government agreed to lift the legal direction that GM should achieve compliance with legal NO_2 limits by 2024. It has issued a new direction for compliance in the shortest possible time and by 2026 at the latest.

In July 2022 a new investment-led, non-charging Greater Manchester Clean Air Plan GM was submitted. At the end of 2022 government asked for provide further evidence in support of the plan. GM leaders expect to provide the additional evidence, which requires detailed modelling, to government by the end of June 2023. They remain committed and confident of the case for the investment-led, non-charging plan.

Once they have had full, formal government feedback on our Clean Air Plan following the submission of this additional evidence, we will consider timescales for a public consultation on the plan.

All costs associated with the new plan, including the essential requirement to update existing signage in HPBC will continue to be funded by government.

Further information on the progress of the Manchester clean air plan can be found https://cleanairgm.com/.

New Planning Developments

Several new developments have been progressed in 2022. Table C.1 details a list of planning applications with its assessment reference and planning reference. If it is a major development, then HPBC are requesting that an Air Quality Assessment (AQA) or Low Emission Strategy.

Table C.1 – Details of Planning Application in HPBC during 2021

Assessment date	Assessment reference	Site location	x	y	Planning Reference	Planning Proposal
14/11/2022	5886r1	Land Off Hallsteads Close, Hallsteads Close, Dove Holes, Derbyshire,	407755	378740	DOC/2022/0060	Discharge of conditions 3, 4, 5, 8, 14, 15, 17-19, 22, 25, 26, 27, 28, 29, 32, 34 relating to HPK/2019/0028
01/06/2022	C10731/AQA/1.0	Milltown, Glossop	403913	394039	HPK/2022/0317	Demolition of derelict industrial buildings, the erection of 25 new houses and two apartment buildings (51 units and 9 units respectively), conversion of Easton House into 10no. apartments and its former Coach house to 3no. dwellings, along with associated access works (including a new footway to Milltown and a newriverside walkway), car parking, restoration of Mill Pond, landscaping, amenity space and all associated works.
01/06/2022	C10731/AQA/1.0	Eastern Mill, Milltown, Glossop, Derbyshire,	403909	394030	HPK/2022/0317	Demolition of derelict industrial buildings, the erection of 25 new houses and two apartment buildings (51 units and 9 units respectively), conversion of Easton House into 10no. apartments and its former Coach house to 3no. dwellings, along with associated access works (including a new footway to Milltown and a newriverside walkway), car parking, restoration of Mill Pond, landscaping, amenity space and all associated works.
29/04/2022	4962r1	Land At, Granby Road, Fairfield, Buxton, Derbyshire,	407451	373035	HPK/2022/0352	The erection of 147 dwellings including the provision of two vehicular access points, the construction of roads, footways, and a pedestrian link with Tongue Lane, drainage infrastructure, public open space, landscaping, and other associated works.
07/03/2022	211101	Albion Road, New Mills	399610	384738	HPK/2022/0066	Outline planning approval for demolition of existing buildings and the construction of 52 dwellings with all matters reserved apart from access

01/03/2022	Mar-22	Beelow Lane Quarry contiguous with Doveholes Quarry, Dale Road, Doveholes, Buxton	409046	378735	NP/HPK/0322/0437	Application for determination of conditions as required under Section 96 and Schedule 14 of the Environment Act 1995 and proposed diversion of Beelow Lane
01/12/2021	NT14126/EIA/2/012A	Hope Cement Works, Hope	403909	394030	NP/HPK/1020/0929	Material unloading, conveying and storage facility and associated importation of shale substitute kiln feed material (ARM).
22/10/2021	n/a	Land at Waterswallows Road, Green Fairfield	399610	384738	HPK/2021/0432	Variation of condition 2 in relation to HPK/2015/0617 [replacement of diesel generators with battery storage technology] - likely positive impact from noise and air quality
22/10/2021	n/a	Land at Waterswallows Road, Green Fairfield	407755	378740	HPK/2021/0433	Variation of condition 2 in relation to HPK/2014/0440 [replacement of diesel generators with battery storage technology] - likely positive impact from noise and air quality
01/03/2021	4302r2	Land at Foxlow Farm, Harpur Hill Road, Hapur Hill, Buxton	407451	373035	HPK/2021/0145	Full planning application for the development of a Local Centre comprising a foodstore (Use Class E (a)), children's day nursery (Use Class E (f)) and flexible commercial/retail units (Use Class E and Sui Generis (hot food takeaway, veterinary surgery, public house/drinking establishment)) along with parking, access and other associated works
24/02/2021	R21.10535/4/AG	Hindlow Quarry, Buxton Road, Sterndale Moor, Buxton	409755	368030	R1/0621/34	Review of Mineral Permissions (ROMP)
10/08/2020	AQ_assessment/2020/Britannia Mill	Britannia Mills Trading Estate, Buxworth, Derbyshire	409755	368030	HPK/2020/0071	Outline Permission with all matters reserved for the demolition of existing buildings and removal/demolition of other infrastructure; and development of 110 dwellings with associated infrastructure; development of a multi-purpose community and tourist facility (for use by the community and in connection with the Bugsworth Canal Basin); the provision of car parking (44 spaces) for use in connection with the community/tourism facility, and for visitors to the Bugsworth Canal Basin; the provision of formal and informal recreation space; the provision of PROWs; and the erection of a bridge linking the site with the Bugsworth Canal Basin.

28/05/2020	Hogshaw Roundabout, Buxton Air Quality Assessment	A6 to the north of Buxton, adjacent to, Fairfield Common, North Road, Buxton, Derbyshire,	406831 ,	374226	CON/2020/0010	Construction of a new 4 arm roundabout junction centred on the A6 to the north of Buxton, including the initial lengths of access roads off the roundabout to the west and to the south east
26/11/2019	2708191AQ Version 1	Land Adjacent To The Haulage Yard, Buxton Road, Furness Vale, Derbyshire,	403913	394039	HPK/2020/0201	Residential development (Class C3) with associated access, parking and landscaping. The development comprises of 39 houses, mix of 2 and 3 bedroom that will offer the size and types of homes that respond to the housing needs of the area.
01/10/2016	403.04047.00003 Issue 1	Hindlow Works, Buxton Road, Buxton, SK17 0EL	409046	378735	CM1/0320/85	The installation and operation of a CHP plant which would generate both electrical and thermal energy through the combustion of natural gas. - New application to reguralise non-conformaties in the implementation of previous permission CM1/1016/58 (from 2017).

Additional Air Quality Works Undertaken by High Peak Borough Council During 2022

Air Quality Action Plan Update

The revised AQAP is in preparation. A conservative revised detailed assessment and source apportionment exercise has been completed for all existing AQMA's, and the area of concern in Fairfield Road in Buxton (Appendix G). This established that the current AQMA's should remain in place, and monitoring expanded in some instance. It also confirm that the area of concern at Fairfield Road, Buxton should be declared as an AQMA.

A provisional set of additional measures have been identified to discussed within the steering group (Appendix F) Unfortunately, the setting up of the steering groups was in part delayed due to Council elections in early May, purdah and the change of administration.

The steering groups are now in the process of being set up with a view to meeting to discuss the proposed measures, with a view to publishing the full strategy by the 4th Quarter of 2023.

The new Buxton AQMA is set to be declared after approval from cabinet, which has provisionally been set for summer 2023.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes for the year 2022 were supplied and analysed by Staffordshire Scientific Services, the tubes were prepared using the 20% TEA in water preparation method. All results have been bias adjusted and annualised where required before being presented in Table A.4.

Staffordshire Scientific Services is a UKAS accredited laboratory and participates in the AIR-PT Scheme for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The latest available AIR-PT results are AIR-PT AR050 (May - June 2022), AIR-PT AR049 (January – February 2022), AIR-PT AR046 (September – October 2021) and AIR-PT AR045 (July - August 2021).

Staffordshire Scientific Services scored 100% on all four PT rounds. The percentage score reflects the results deemed to be satisfactory based upon the z-score of < ± 2.

The precision of all 13 current local authority co-location studies in 2022 detailed within the national bias adjustment factor spreadsheet (version 06/23) was rated as ‘good’ (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

Diffusion tube monitoring during 2022 was undertaken in line with the Diffusion Tube Monitoring Calendar and recommended exposure period (5 weeks (+/- 4 days)).

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. According to TG22, 75% data capture is equivalent to 9 months of monitoring assuming monitoring has been completed in line with the Defra monitoring calendar. In addition, any sites with a data capture below 25% do not require annualisation.

No diffusion tubes required annualisation during the monitoring year of 2022.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

HPBC do not have any co-location studies within the borough to derive a local bias factor. Therefore, HPBC have applied a national bias adjustment factor of 0.86 to the 2022 monitoring data. A summary of bias adjustment factors used by HPBC over the past five years is presented in Table C.2. The National Diffusion Tube Bias Adjustment Factor Spreadsheet is shown in Figure C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	06/23	0.86
2021	National	06/22	0.85
2020	National	09/21	0.85
2019	National	09/20	0.93
2018	National	06/19	0.89

Figure C.2 National Diffusion Tube Bias Adjustment Factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 06/23

Follow the steps below in the correct order to show the results of relevant co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of September 2023

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List. If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List. If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List. If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Staffordshire Scientific Services	20% TEA in water	2022	KS	Manchester City Council	12	49	43	13.8%	G	**0.88**
Staffordshire Scientific Services	20% TEA in water	2022	UC	Manchester City Council	12	29	29	0.4%	G	**1.00**
Staffordshire Scientific Services	20% TEA in water	2022	SI	Manchester City Council	12	17	16	12.1%	G	**0.89**
Staffordshire Scientific Services	20% TEA in water	2022	KS	Marylebone Road Intercomparison	12	51	42	20.5%	G	**0.83**
Staffordshire Scientific Services	20% TEA in water	2022	UB	Salford City Council	12	23	22	6.9%	G	**0.94**
Staffordshire Scientific Services	20% TEA in water	2022	B	Salford City Council	10	13	11	16.3%	G	**0.86**
Staffordshire Scientific Services	20% TEA in water	2022	R	Salford City Council	12	40	34	17.6%	G	**0.85**
Staffordshire Scientific Services	20% TEA in water	2022	R	Bury Council	11	24	21	16.0%	G	**0.86**
Staffordshire Scientific Services	20% TEA in water	2022	R	East Staffordshire Borough Council	10	39	31	23.9%	G	**0.81**
Staffordshire Scientific Services	20% TEA in water	2022	UB	Stoke-on-Trent City Council	11	23	20	17.1%	G	**0.85**
Staffordshire Scientific Services	20% TEA in water	2022	UB	Wigan Council	12	21	17	21.6%	G	**0.82**
Staffordshire Scientific Services	20% TEA in water	2022	R	Wigan Council	12	27	22	22.6%	G	**0.82**
Staffordshire Scientific Services	20% TEA in Water	2022	R	Bolton Council	9	29	23	25.6%	G	**0.80**
Staffordshire Scientific Services	20% TEA in water	2022		**Overall Factor[3] (13 studies)**				Use		**0.86**

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

In line with LAQM.TG(22), distance correction has been applied to NO_2 monitoring sites that have recorded an annual mean concentration above or within 10% of the annual mean objective. During 2022 there were six locations that recorded concentrations greater than 36 µg/m³ that are not sited at locations of relevant exposure. These concentrations were distance-corrected using the Diffusion Tube Data Processing Tool (version 2.0)[9],as shown in Table C.3 below.

Table C.3 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
HP25a, HP25b	0.6	3.4	37.6	8.7	28.6	
HP33A, HP33B	2.7	3.1	37.3	9.1	*36.4*	*Predicted concentration at Receptor within 10% the AQS objective.*
HP41A, HP41B	2.0	2.3	36.8	9.1	35.8	
HP42A, HP42B	2.2	5.3	45.5	9.1	*37.9*	*Predicted concentration at Receptor within 10% the AQS objective.*
HP44	1.6	2.0	40.7	9.1	*39.3*	*Predicted concentration at Receptor within 10% the AQS objective.*
HP63A, HP63B	1.2	3.9	42.7	8.4	34.2	

QA/QC of Automatic Monitoring

Ladybower automatic continuous monitoring station is audited and maintained by Bureau Veritas as part of the AURN, and therefore the QA/QC procedures are not reported within this ASR. Full datasets are available through the UK Air website.

Automatic Monitoring Annualisation

The Ladybower AURN station recorded data capture of greater than 75% during 2022 (97.6% and 98.0% for NO_2 and SO_2, respectively), therefore no annualisation was required.

[9] Diffusion Tube Data Processing Tool (v2.0) available https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-data-processing-tool/

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No automatic NO_2 monitoring locations within HPBC required distance correction during 2022.

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 – Map of Automatic Monitoring Location: Ladybower AURN

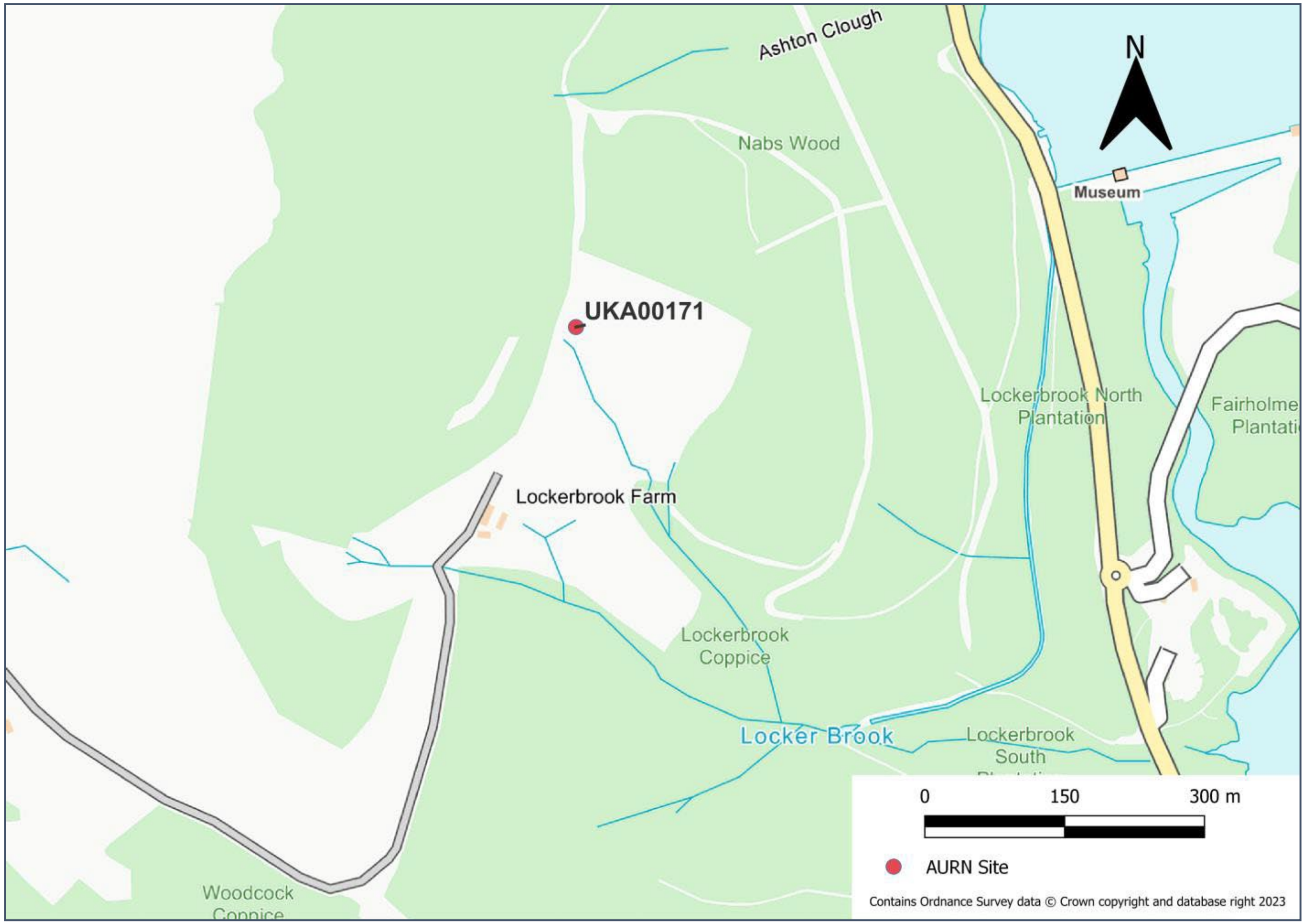


Figure D.2 – Map of Non-Automatic Monitoring Locations around Tintwistle AQMA

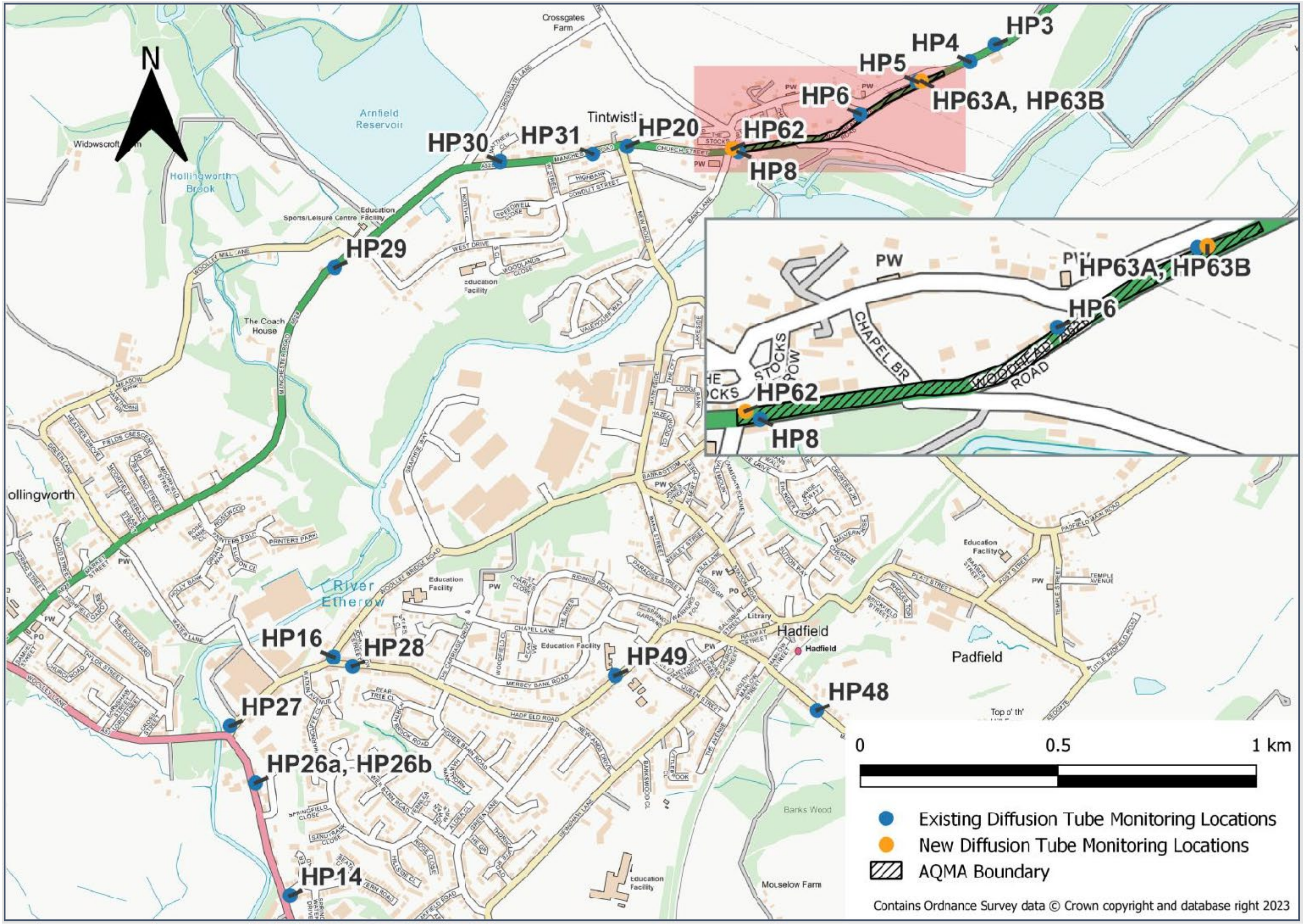


Figure D.3 – Map of Non-Automatic Monitoring Locations around Dinting Vale AQMA

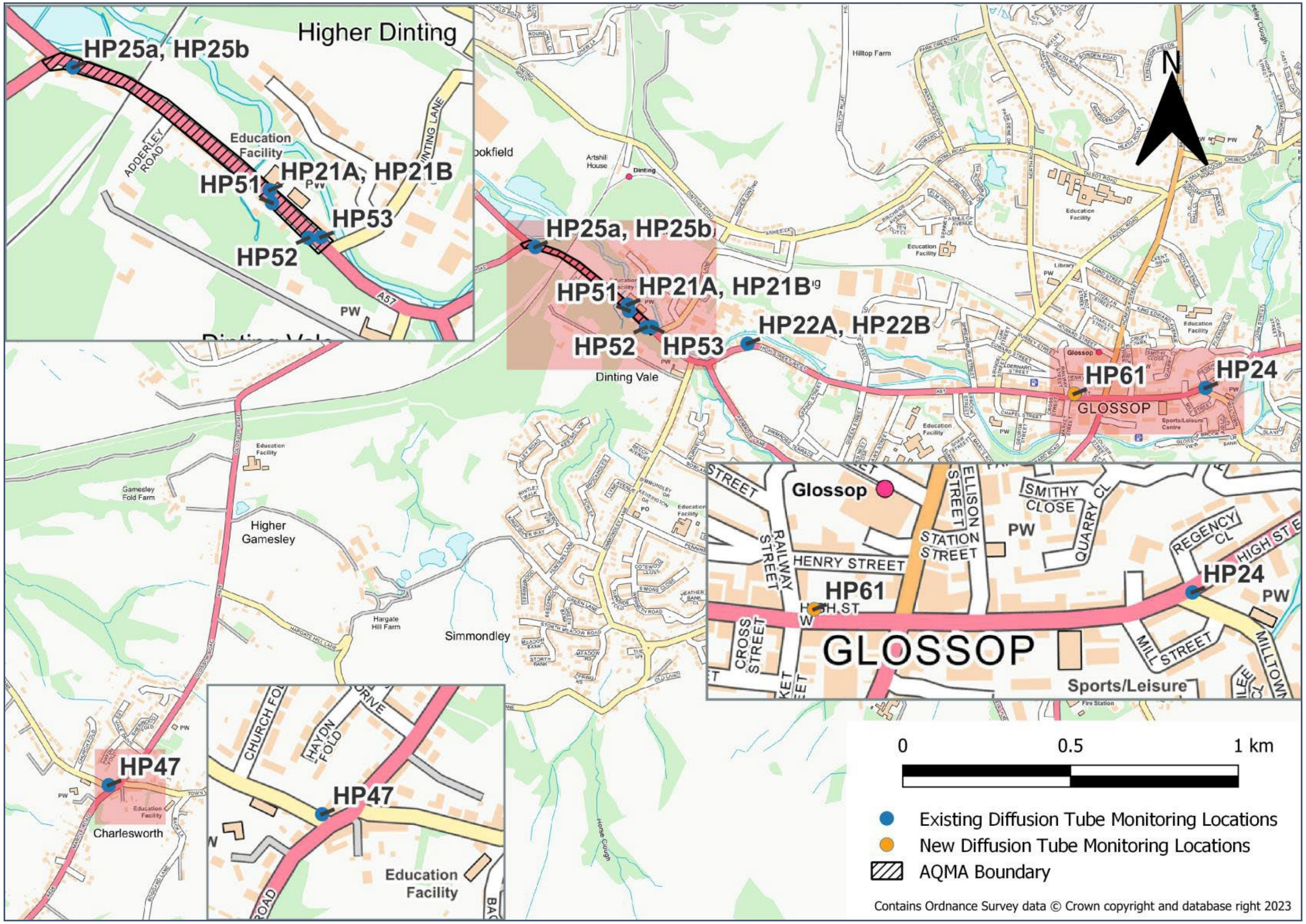


Figure D.4 – Map of Non-Automatic Monitoring Locations Outside of AQMAs: Bridgemont, Furness Vale, Newtown, New Mills and Whaley Bridge

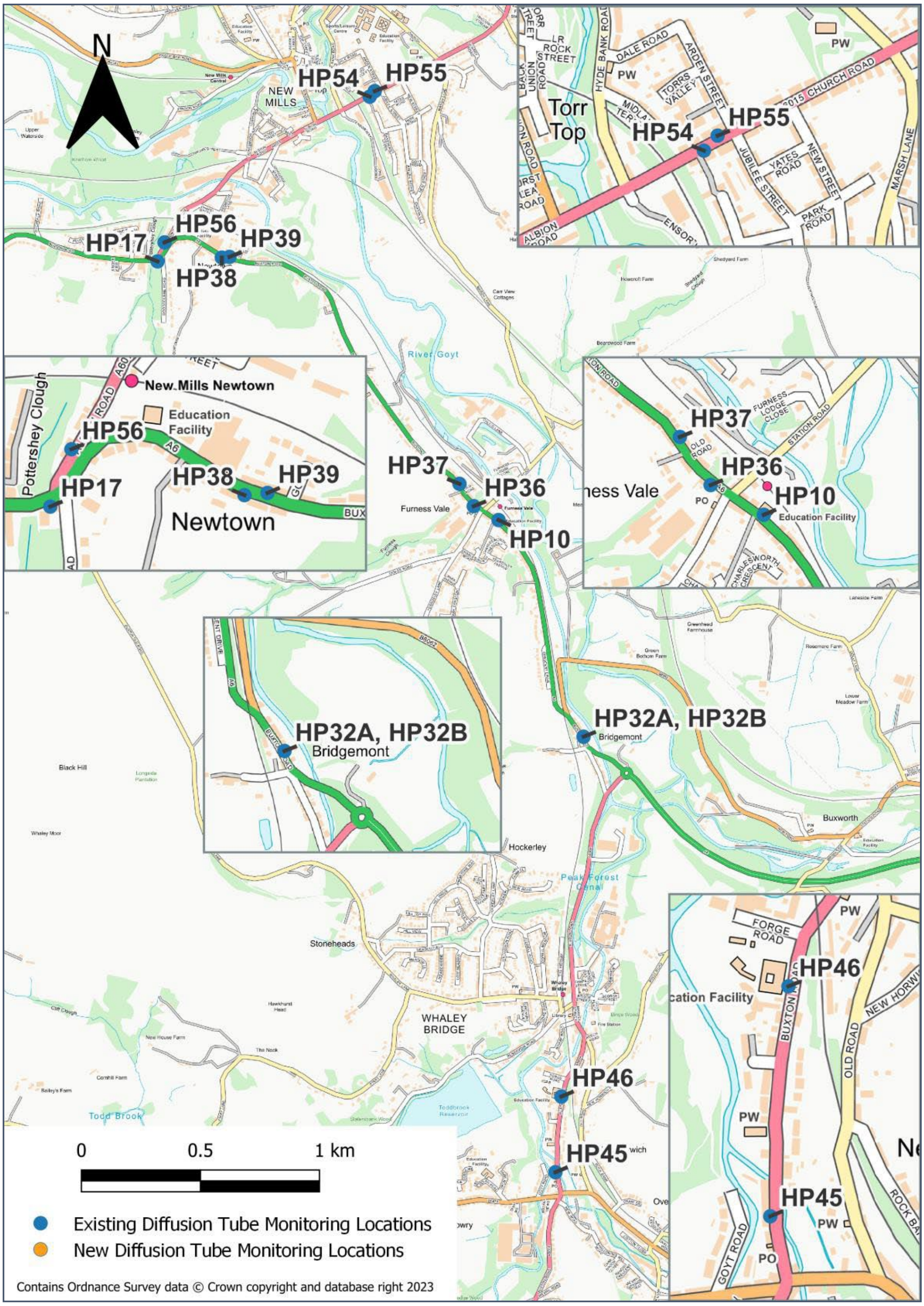


Figure D.5 – Map of Non-Automatic Monitoring Locations Outside of AQMAs: Dove Holes and Peak Forest

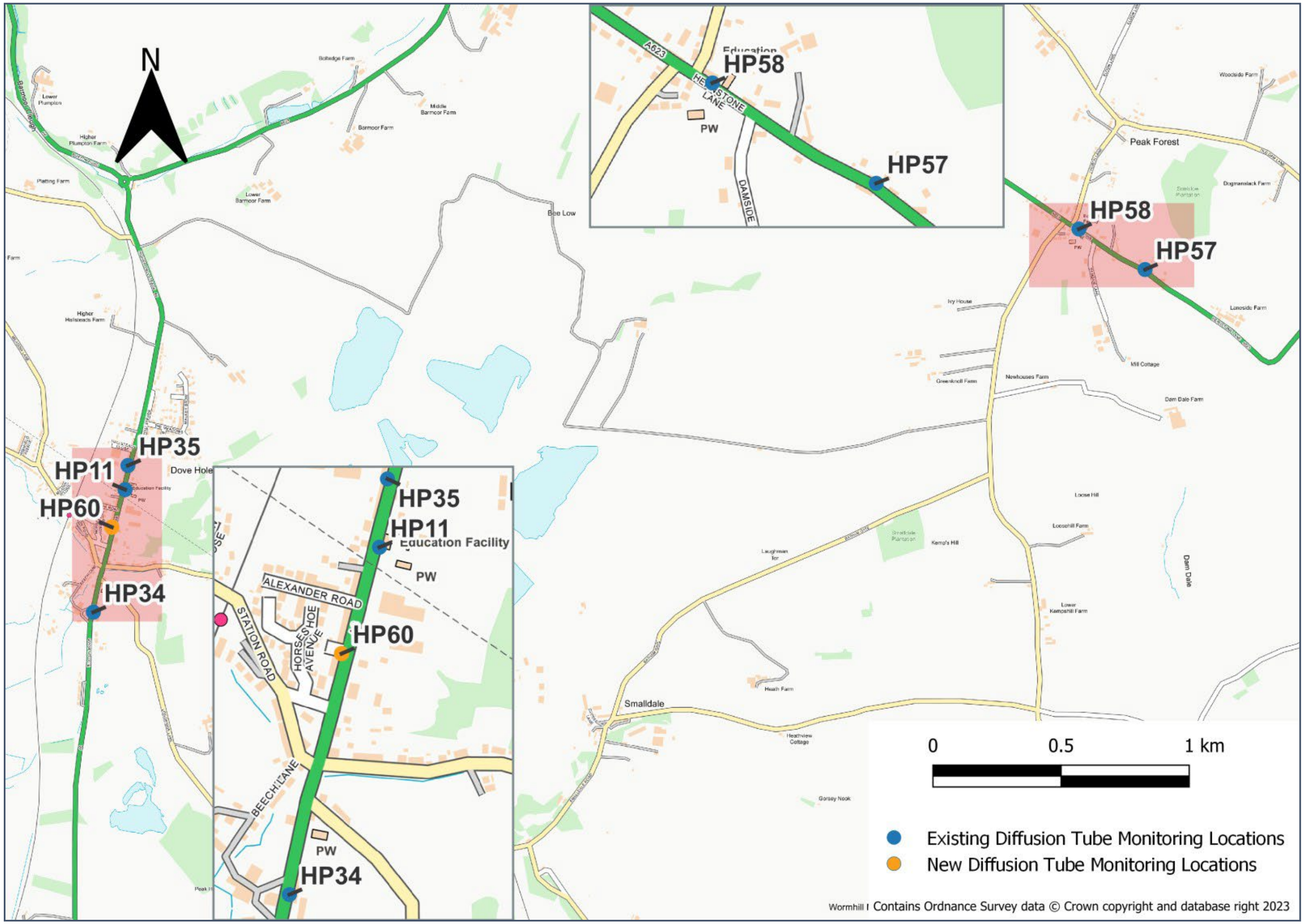


Figure D.6 – Map of Non-Automatic Monitoring Locations Outside of AQMAs: Buxton and Fairfield

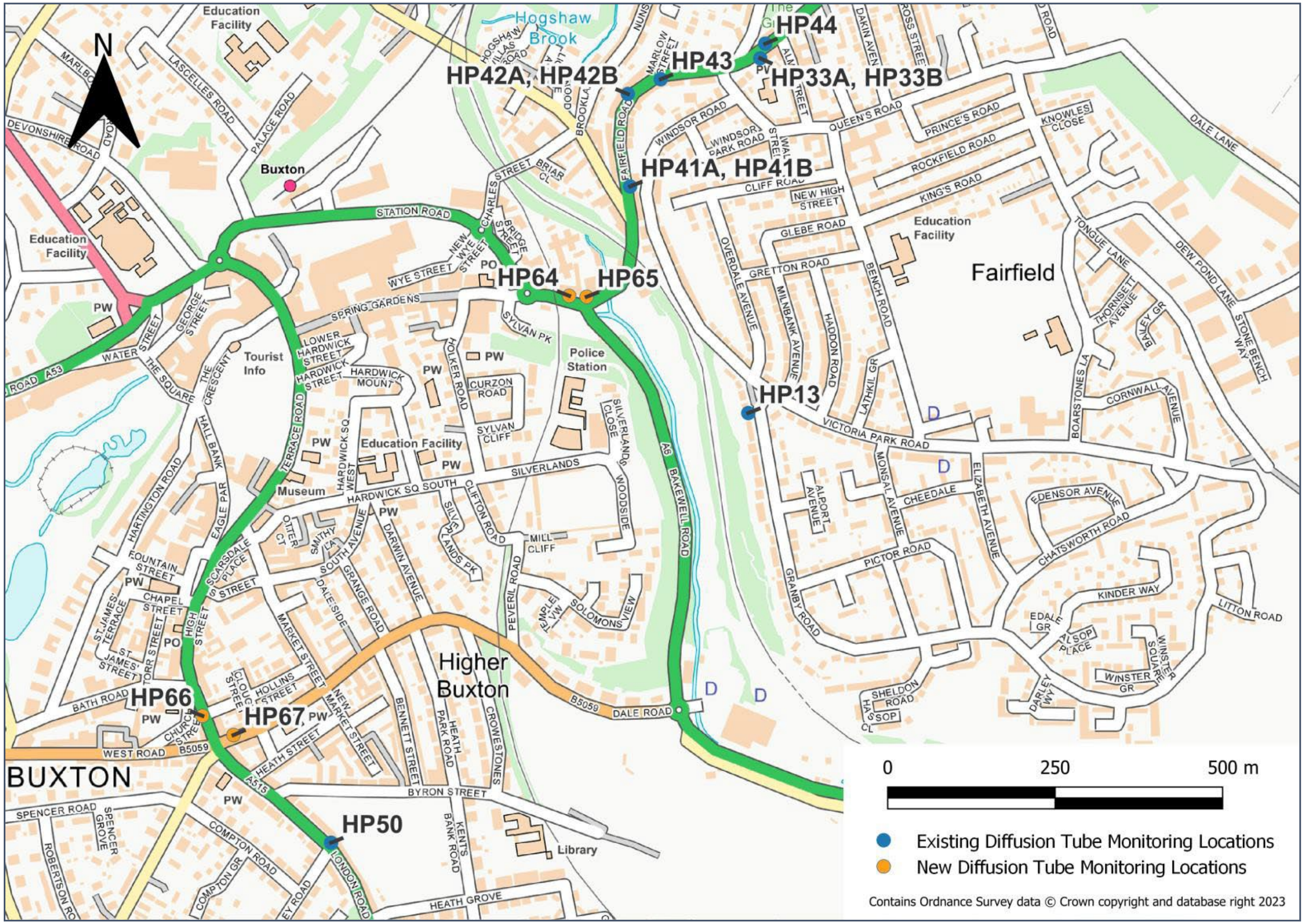
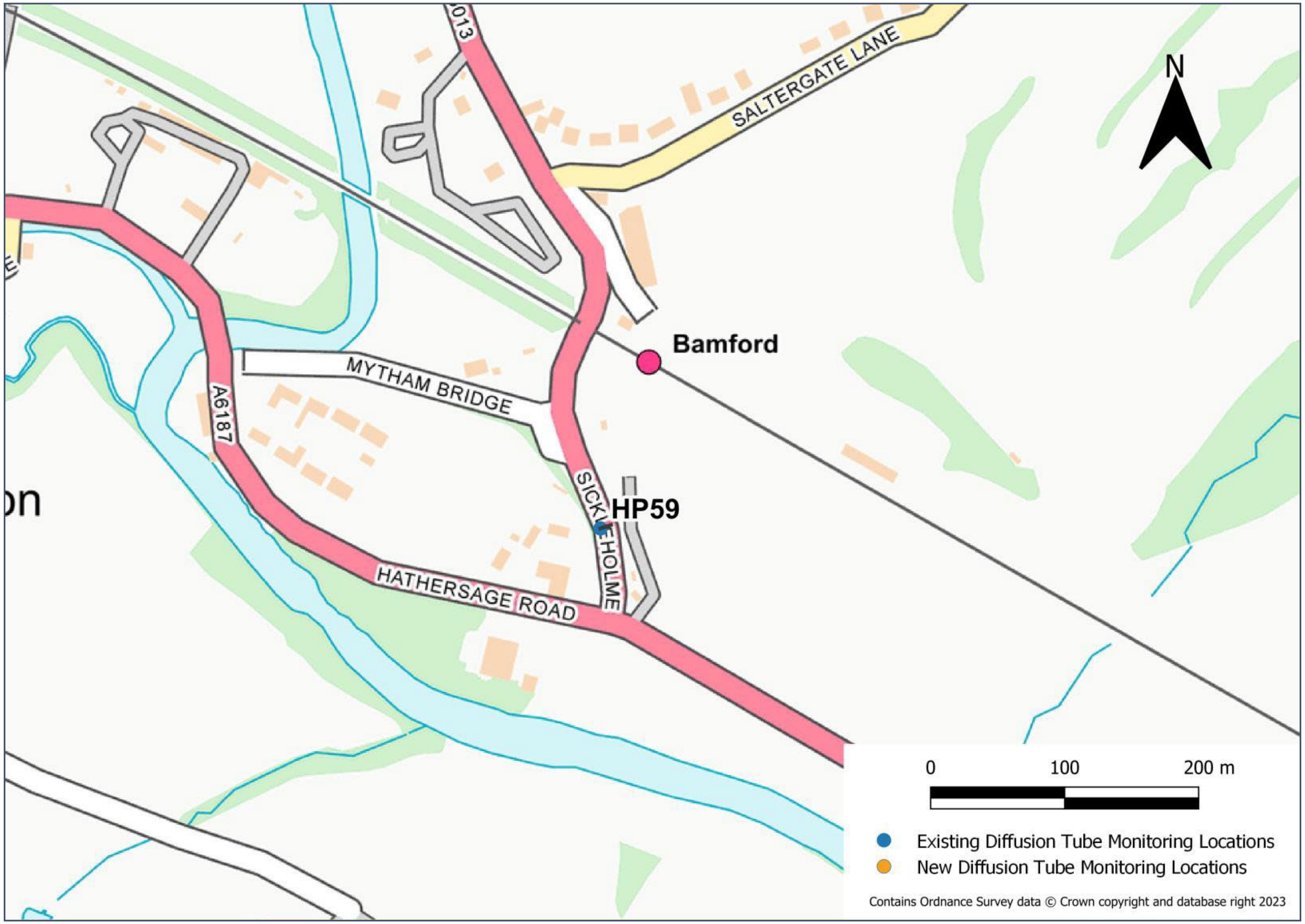


Figure D.7 – Map of Non-Automatic Monitoring Locations Outside of AQMAs: Part 4



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[10]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[10] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Appendix F: Detailed Modelling Study

High Peak Borough Council AQMA Review

Detailed Modelling Study

December 2022

BUREAU VERITAS

Move Forward with Confidence

Document Control Sheet

Identification	
Client	High Peak Borough Council
Document Title	AQMA Review – Detailed Modelling Study (Technical Note)
Bureau Veritas Ref No.	AIR15154477

Contact Details		
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Executive Summary

High Peak Borough Council have commissioned Bureau Veritas to complete a review of the existing Air Quality Management Areas to help in the development of a new Air Quality Action Plan. The Council currently has two AQMA designations, both of which have been declared for exceedances of the NO_2 annual mean. There is also an area along Fairfield Road where it is suspected that the NO_2 annual mean objective of 40 µg/m^3 is being exceeded. Therefore, this area has been included in this assessment, along with the two AQMA designations, to model current level of NO_2 in these areas.

A dispersion modelling assessment has been completed whereby NO_2 concentrations have been predicted across all relevant areas at specific receptor locations. This has been used to supplement local monitoring data to provide a clear picture of the pollutant concentrations within High Peak.

Currently there are two Air Quality Management Areas declared by High Peak Borough Council, both for exceedances of the 40 µg/m^3 annual mean objective for Nitrogen Dioxide (NO_2). The two Air Quality Management Areas are defined as follows:

- AQMA 1 (Tintwistle) – A section of Woodhead Road between the Bank Lane/Woodhead Road junction, and the Old Road/Woodhead Road junction (Declared September 2019).
- AQMA 2 (Dinting Vale) – A section of the A57 between the A626 Glossop Road/A57 Dinting Vale junction and the A57 Dinting Value/Dinting Lane Junction (Declared December 2019).

The aim of this detailed modelling study is to increase High Peak Borough Council's understanding of pollutant concentrations within High Peak in order to provide technical input into the AQAP and identify if changes to the current AQMAs are required.

Following the completion of the analysis of both monitoring data and modelled concentrations across all of the assessed areas, the following conclusions have been made:

- The NO_2 annual mean objective was not predicted to be exceeded at any receptor location included within the model in AQMA 1 (Tintwistle). The maximum modelled NO_2 concentration at AQMA 1 was 33.7 µg/m^3.
- The NO_2 annual mean objective was predicted to be exceeded at multiple receptor locations within the model in AQMA 2 (Dinting Vale). The maximum modelled NO_2 concentration at AQMA 2 was 48.0 µg/m^3.
- Outside of the AQMA designations, exceedances of the NO_2 annual mean were noted along a stretch of Fairfield Road, with concentrations recorded that were significantly above the annual mean objective. The maximum modelled NO_2 concentration along Fairfield Road was 23.0 µg/m^3 above the objective (63.0 µg/m^3).

A source apportionment exercise was also undertaken for each AQMA designation and the area of concern noted along Fairfield Road. From this analysis, it was evident that diesel cars and diesel LGVs are the primary contributors to road NO_x in these areas.

The next steps upon completion of this Detailed Assessment are to develop, through consideration of merit, a defined set of achievable measures to be brough forward for inclusion in the Air Quality Action Plan document. On selecting these measures, the Council should ensure they target the main sources of pollution in each of the modelled areas, based on the results of the source apportionment exercise.

Given the findings of the assessment around the area of concern on Fairfield Road, the Council may wish to declare a new AQMA in this area.

1 Introduction

High Peak Borough Council ("the Council") have commissioned Bureau Veritas to complete a review of the Council's existing Air Quality Management Areas (AQMAs) to help in the development of a new Air Quality Action Plan (AQAP). Currently, there are two AQMAs in force within High Peak, both declared in 2019 due to exceedances of the 40 µg/m^3 annual mean objective for NO_2; the Tintwistle AQMA (No.1) and the Dinting Vale AQMA (No. 2). AQMA 1 covers the area of the A628 between the junctions with Old Road and Bank Lane, whilst AQMA 2 covers the area of the A57 between Glossop Road and Dinting Lane. The geographical extent of the AQMAs included in this assessment is shown in Figure 1.1 and Figure 1.2, and the details of both these AQMAs are as follows:

- **AQMA 1 (Tintwistle)**
  - **Extent:** A section of Woodhead Road between the Bank Lane/Woodhead Road junction, and the Old Road/Woodhead Road junction.
  - **Declared:** September 2019.
  - **Pollutant:** Nitrogen Dioxide (NO_2) Annual Mean.
- **AQMA 2 (Dinting Vale)**
  - **Extent:** A section of the A57 between the A626 Glossop Road/A57 Dinting Vale junction and the A57 Dinting Value/Dinting Lane Junction.
  - **Declared:** December 2019.
  - **Pollutant:** Nitrogen Dioxide (NO_2) Annual Mean.

Figure 1.1 – Location of AQMA 1 (Tintwistle)

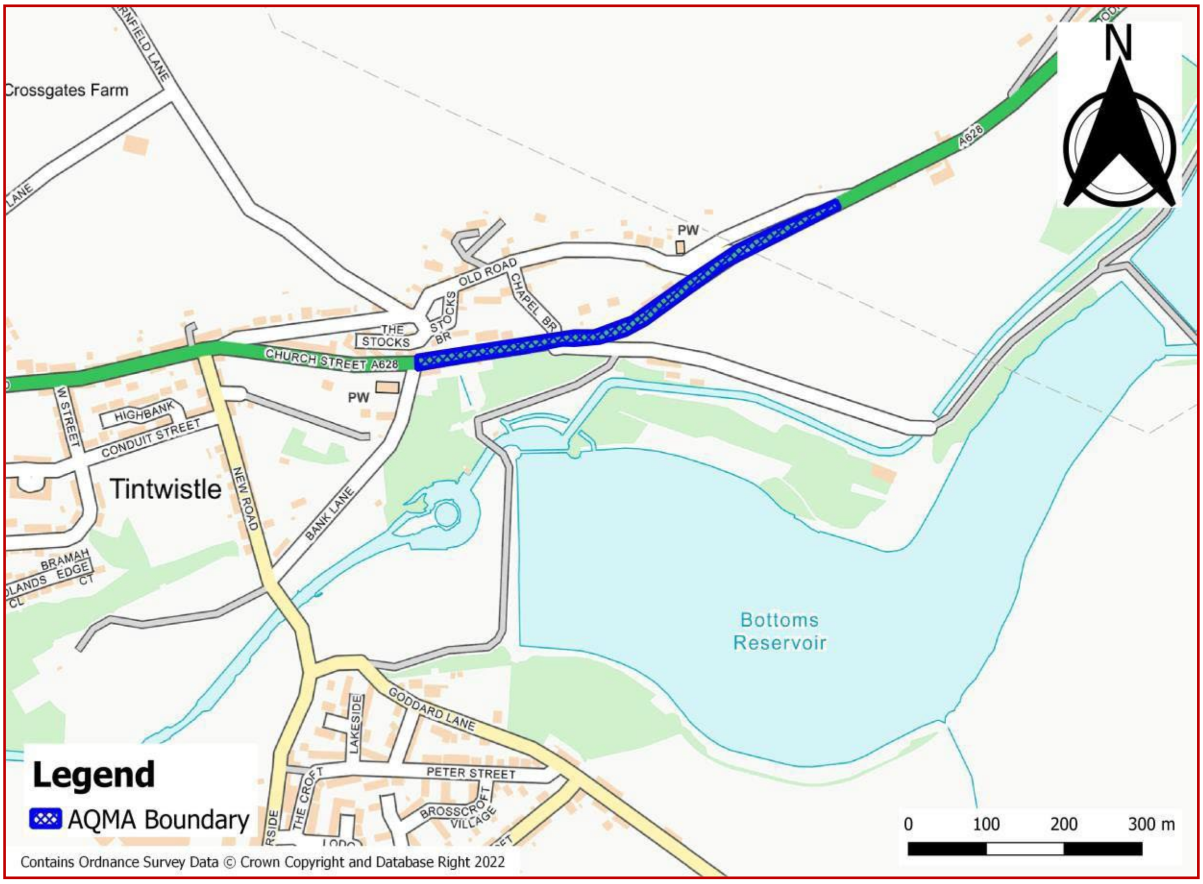
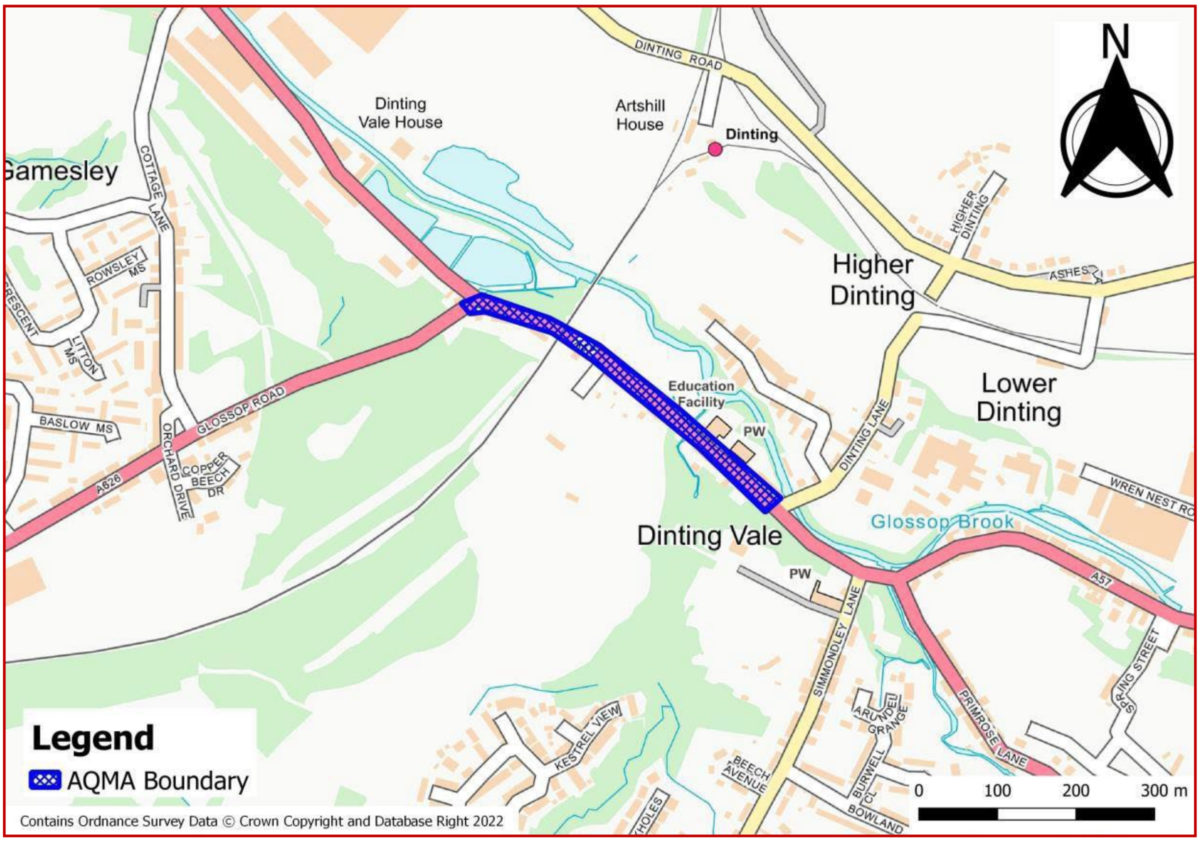


Figure 1.2 – Location of AQMA 2 (Dinting Vale)



There are also concerns that the NO_2 annual mean objective is being exceeded along a section of the A6 (Fairfield Road) in Buxton. This area has therefore also been included in this modelling study.

1.1 Scope of Assessment

This assessment seeks to predict the the magnitude and geographical extent of any exceedances of the AQS objectives for NO_2, $PM_{2.5}$ and PM_{10} enabling the Council to provide a focused consideration on developing measures as part of the AQAP for each of the two AQMAs.

The following are the objectives of the assessment:

- To assess the air quality at selected locations ("receptors") representative of worst-case exposure relative to the averaging period of focus (i.e. annual objective - façades of the existing residential units), based on modelling of emissions from road traffic on the local road network;
- To establish the spatial extent of any likely exceedances of the UK annual mean NO_2 AQS objective limit, and to identify the spatial extent of any areas within 10%;
- To establish the required reduction in emissions to comply with the UK AQS objectives; and
- To determine the relative contributions of various source types to the overall pollutant concentrations within the AQMAs, through source apportionment, in order to inform an updated AQAP.

The approach adopted in this assessment to determine the impact of road traffic emissions on air quality utilised the atmospheric dispersion model ADMS-Roads 5.0, focusing on emissions of oxides of nitrogen (NO_x), which comprise of nitric oxide (NO) and NO_2, and particulates (PM_{10} and $PM_{2.5}$).

2 Air Quality – Legislative Context

2.1 Air Quality Strategy

The importance of existing and future pollutant concentrations can be assessed in relation to the national air quality standards and objectives established by Government. The Air Quality Strategy[1] (AQS) provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards and objectives established by the UK Government and Devolved Administrations to protect human health. The air quality objectives incorporated in the AQS and the UK Legislation are derived from Limit Values prescribed in the EU Directives transposed into national legislation by Member States.

The CAFE (Clean Air for Europe) programme was initiated in the late 1990s to draw together previous directives into a single EU Directive on air quality. The CAFE Directive[2] has been adopted and replaces all previous air quality Directives, except the 4th Daughter Directive[3]. The Directive introduces new obligatory standards for $PM_{2.5}$ for Government but places no statutory duty on local government to work towards achievement of these standards.

The Air Quality Standards (England) Regulations[4] 2010 came into force on 11 June 2010 in order to align and bring together in one statutory instrument the Government's obligations to fulfil the requirements of the new CAFE Directive.

The objectives for ten pollutants – benzene (C_6H_6), 1,3-butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), ozone (O_3) and Polycyclic Aromatic Hydrocarbons (PAHs), have been prescribed within the AQS[1].

The EU Limit Values are considered to apply everywhere with the exception of the carriageway and central reservation of roads and any location where the public do not have access (e.g. industrial sites).

The AQS objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period. Typically, these include residential properties and schools/care homes for long-term (i.e. annual mean) pollutant objectives and high streets for short-term (i.e. 1-hour) pollutant objectives. Table 2.1 taken from LAQM TG(22) provides an indication of those locations that may or may not be relevant for each averaging period.

This assessment focuses on NO_2 due to the significance this pollutant holds within the Council's administrative area - evidenced by the declared borough-wide AQMA. Moreover, as a result of traffic pollution the UK has failed to meet the EU Limit Values for this pollutant by the 2010 target date. As a result, the Government has had to submit time extension applications for compliance with the EU Limit Values, which has since passed and its continued failure to achieve these limits is currently giving rise to infraction procedures being implemented. The UK is not alone as the challenge of NO_2 compliance at EU level includes many other Member States.

In July 2017, the Government published its plan for tackling roadside NO_2 concentrations[5], to achieve compliance with EU Limit Values. This sets out Government policies for bringing NO_2 concentrations

[1] Defra (2007), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

[2] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

[3] Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic hydrocarbons in ambient air.

[4] The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001, The Stationary Office Limited.

[5] Defra, DfT (2017), UK plan for tackling roadside nitrogen dioxide concentrations

within statutory limits in the shortest time period possible. Furthermore, the Clean Air Strategy was published in 2019, which outlines how the UK will meet international commitments to significantly reduce emissions of five damaging air pollutants by 2020 and 2030 under the adopted revised National Emissions Ceiling Directive (NECD)

The AQS objectives for these pollutants are presented in Table 2.2.

Table 2.1 – Examples of where the Air Quality Objectives should apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens or residential properties[1].	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be shorter than either the 24- or 8-hour relevant mean.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more. Any outdoor locations at which the public may be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-minute mean	All locations where members of the public might reasonably be expected to spend a period of 15 minutes or longer.	
Note [1] For gardens and playgrounds, such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.		

Table 2.2 – Relevant AQS Objectives for the Assessed Pollutants in England

Pollutant	AQS Objective	Concentration Measured as:	Date for Achievement
Nitrogen dioxide (NO_2)	200 µg/m³ not to be exceeded more than 18 times per year	1-hour mean	31st December 2005
	40 µg/m³	Annual mean	31st December 2005
Particles PM_{10}	50 µg/m³ not to be exceeded more than 35 times a year	24-hour mean	31st December 2004
	40 µg/m³	Annual mean	31st December 2004
Particles $PM_{2.5}$	20 µg/m³	Annual mean	31st December 2010
$PM_{2.5}$ Exposure Reduction	Target of 15% reduction in concentrations at urban background	Annual Mean	Between 2010 and 2020

2.2 Local Air Quality Management (LAQM)

Part IV of the Environment Act 1995[6] (as amended 2021)[7] places a statutory duty on local authorities to periodically review and assess air quality within their area, and determine whether they are likely to meet the AQS objectives set down by Government for a number of pollutants – a process known as Local Air Quality Management (LAQM). The AQS objectives that apply to LAQM are defined for seven pollutants: benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, sulphur dioxide and particulate matter.

Local Authorities were formerly required to report on all of these pollutants, but following an update to the regime in 2016, the core of LAQM reporting is now focussed on the objectives of three pollutants; NO_2, PM_{10} and SO_2. Where the results of the Review and Assessment process highlight that problems in the attainment of the health-based objectives pertaining to the above pollutants will arise, the authority is required to declare an AQMA – a geographic area defined by high concentrations of pollution and exceedances of health-based standards.

The areas in which the AQS objectives apply are defined in the AQS as locations outside (i.e. at the façade) of buildings or other natural or man-made structures above or below ground where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period of the AQS objective.

Following any given declaration, the Local Authority is subsequently required to develop an Air Quality Action Plan (AQAP), which will contain measures to address the identified air quality issue, and bring the location into compliance with the relevant objective as soon as possible.

6 Part IV of the Environment Act 1995. Published by the UK Government, 28th July 1995, Available at: http://www.legislation.gov.uk/ukpga/1995/25/part/IV

7 Part IV of the Environment Act 2021. Published by the UK Government, 16th November 2021. Available at: https://www.legislation.gov.uk/ukpga/2021/30/part/4/enacted

3 Review and Assessment of Air Quality Undertaken by the Council

3.1 Local Air Quality Management

High Peak Borough Council currently have two AQMAs declared as a result of exceedances of the 40 µg/m^3 annual mean objective for NO_2. The two AQMAs are defined as follows:

- AQMA 1 (Tintwistle) – A section of Woodhead Road between the Bank Lane/Woodhead Road junction, and the Old Road/Woodhead Road junction (Declared September 2019).

- AQMA 2 (Dinting Vale) – A section of the A57 between the A626 Glossop Road/A57 Dinting Vale junction and the A57 Dinting Value/Dinting Lane Junction (Declared December 2019).

The most recent LAQM report completed by the Council was the 2022 ASR[8], containing the 2021 monitoring data. The 2022 ASR acknowledged the development of a new AQAP.

In order to provide technical input into an AQAP that will cover the two AQMA boundaries, the air quality modelling has accounted for a pre-COVID-19 base using 2019 traffic data, 2019 monitoring data and the latest Local Air Quality Management (LAQM) tools. Air quality monitoring data has decreased significantly since 2020 due to decrease of traffic under the lockdown during the COVID-19 pandemic. According to the traffic data from the Department for Transport (DfT)[9], traffic in Derbyshire has seen a sharp decline of 22% from 2019 to 2020, which shows the impact of lockdown restrictions on vehicle activity during the COVID-19 pandemic.

This report details the findings of this analysis, and provides recommendation on matters related to NO_2 exceedances, in order to inform a new targeted set of measures within the AQAP.

3.2 Review of Air Quality Monitoring

3.2.1 Local Automatic Air Quality Monitoring

During 2019, High Peak Borough Council did not undertake any automatic (continuous) monitoring. However, there is an Automatic Urban and Rural Network (AURN) site located within the borough, located at Ladybower.

3.2.2 Local Non-Automatic Air Quality Monitoring

During 2019, High Peak Borough Council's non-automatic monitoring programme consisted solely of recording NO_2 concentrations using a network of 41 sites. The details of the diffusion tube monitoring within each AQMA and the area of concern (Fairfield Road) for 2019 are shown in Table 3.1 – High Peak Borough Council Diffusion Tube Monitoring

.

[8] High Peak Borough Council (2022). Annual Status Report. Available at: https://www.highpeak.gov.uk/media/4583/High-Peak-ASR-2019/pdf/High_Peak_ASR_2019.pdf?m=1569832485487

[9] Department for Transport (2022). Road Traffic Statistics. Available at: https://roadtraffic.dft.gov.uk/local-authorities/61

Table 3.1 – High Peak Borough Council Diffusion Tube Monitoring

Site ID	Location	Distance to Road (m)	Annual Mean NO_2 Concentration (µg/m^3)						
			2015	2016	2017	2018	2019	2020	2021
Within AQMA 1 (Tintwistle)									
HP5	81 Woodhead Road, Tintwistle	4.8	**51.8**	**49.9**	**50.9**	**47.0**	*37.4*	20.3	32.9
HP6	75 Woodhead Road, Tintwistle	4.1	35.4	32.1	33.0	32.8	30.0	19.7	26.5
HP8	34 Church Street, Tintwistle	2.1	*38.6*	*36.2*	**46.4**	*39.3*	35.5	24.8	30.6
Within AQMA 2 (Dinting Vale)									
HP21	Dinting School (A57)	1.6	-	-	**44.4**	**41.3**	*38.9*	29.3	32.4
HP25	A57 / Dinting Vale / Glossop Road (West Bound)	0.6	-	-	-	**53.6**	**46.3**	*36.1*	*36.6*
Area of Concern (Fairfield Road)									
HP33	136 Fairfield Road	2.9	-	-	-	**48.2**	**45.4**	33.8	*39.1*
HP41	22 Fairfield (South Bound)	2.1	-	-	-	-	**44.4**	34.1	35.4
HP42	52 Fairfield (North Bound)	2.2	-	-	-	-	**50.3**	*36.5*	**43.7**
HP43	101 Fairfield (South Bound)	1.5	-	-	-	-	34.0	26.5	27.3
HP44	Bulls Head Fairfield (North Bound)	1.6	-	-	-	-	*36.2*	30.6	*36.6*

Between 2019 and 2020, there was an average decrease in the NO_2 concentration of 37% and 23% in AQMA 1 and AQMA 2, respectively. In the area of concern, the NO_2 concentrations in 2020 are 23% lower than in 2019, demonstrating the impact of the COVID-19 pandemic. Therefore, the traffic data and monitoring data prior to 2020 are used to represent a normalised circumstance.

3.3 Defra Background Concentration Estimates

Defra maintains a nationwide model of existing and future background air pollutant concentrations at a 1km x 1km grid square resolution. This data includes annual average concentration for NO_x, NO_2, PM_{10} and $PM_{2.5}$, using a base year of 2019 (the year in which comparisons between modelled and monitoring are made)[10]. The model used to determine the background pollutant levels is semi- empirical in nature: it uses the National Atmospheric Emissions Inventory (NAEI) emissions to model the concentrations of pollutants at the centroid of each 1km grid square, but then calibrates these concentrations in relation to actual monitoring data.

Due to the absence of local background monitoring within High Peak, background concentrations used for the purposes of this assessment have been obtained from the Defra background maps for the relevant 1km x 1km grid squares covering the modelled domain for the year 2019.

[10] Defra Background Maps (2019), available at https://uk-air.defra.gov.uk/data/laqm-background-home

4 Assessment Methodology

To predict pollutant concentrations of road traffic emissions the atmospheric model ADMS Roads version 5.0.0.1 was utilised to model a 2019 baseline predictions scenario. The guiding principles for air quality assessments as set out in the latest guidance and tools provided by Defra for air quality assessment LAQM.TG(22) have been used.

The approach used in this assessment has been based on the following:

- Prediction of NO_2, PM_{10} and $PM_{2.5}$ concentrations to which existing receptors may be exposed and comparison with the relevant AQS objectives;
- Quantification of relative NO_2 contribution of sources to overall NO_2 pollutant concentration; and,
- Determination of the geographical extent of any potential exceedances in regard to the existing AQMA boundaries, and the area of concern on Fairfield Road.

Concentrations of NO_2 have been predicted with a base year of 2019, with model inputs relevant to the assessment based upon the same year. A base year prior to 2020 was used due to the impact of the COVID-19 pandemic affecting pollutant concentrations in 2020. Reductions in travel gave rise to a change of air pollutant emissions associated with road traffic. To demonstrate, the Air Quality Expert Group (AQEG)[11] estimated that during the initial lockdown period in 2020, within urbanised areas of the UK, reductions of between 20-30% were observed in the NO_2 annual mean concentration. Within High Peak, the NO_2 concentrations in 2020 at AQMA 1 and AQMA 2 were 37% and 23% lower than 2019, respectively. At the area of concern along Fairfield Road, the NO_2 concentration in 2019 was 23% lower than that of the previous year. Therefore, using pre-pandemic traffic levels would more likely represent normalised vehicle activity in High Peak.

4.1 Traffic Inputs

Traffic flows for the road links included within the model have been obtained from the road traffic statistics held by the Department for Transport (DfT)[12]. This data source provides an average annual daily traffic (AADT) flow for the relevant road link in terms of a number of vehicle types; cars, LGVs (light goods vehicles), HGVs (heavy goods vehicles), buses and coaches, and motorcycles. The traffic data utilised within the dispersion model is presented in Appendix A.

Traffic speeds were modelled at the relevant speed limit for each road. However, in accordance with Local Air Quality Management Technical Guidance (22)[13], where appropriate, traffic speeds have been reduced to simulate queues at junctions, traffic lights and other locations where queues or slower traffic are known to occur.

The Emissions Factors Toolkit (EFT) version 11.0[14] has been used to determine vehicle emissions factors for input the ADMS-Roads model. The emissions factors are based upon the traffic data inputs used within the assessment, with the total vehicle flows and proportion of vehicle types being obtained from the DfT road traffic statistics.

[11] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID- 19 outbreak in the UK, June 2020

[12] Department for transport (DfT), Road traffic statistics. Available at: https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints

[13] Local Air Quality Management Technical Guidance, LAQM TG(22). August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

[14] Defra, Emissions Factors Toolkit – version 11.0 (2021), available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/

4.2 General Model Inputs

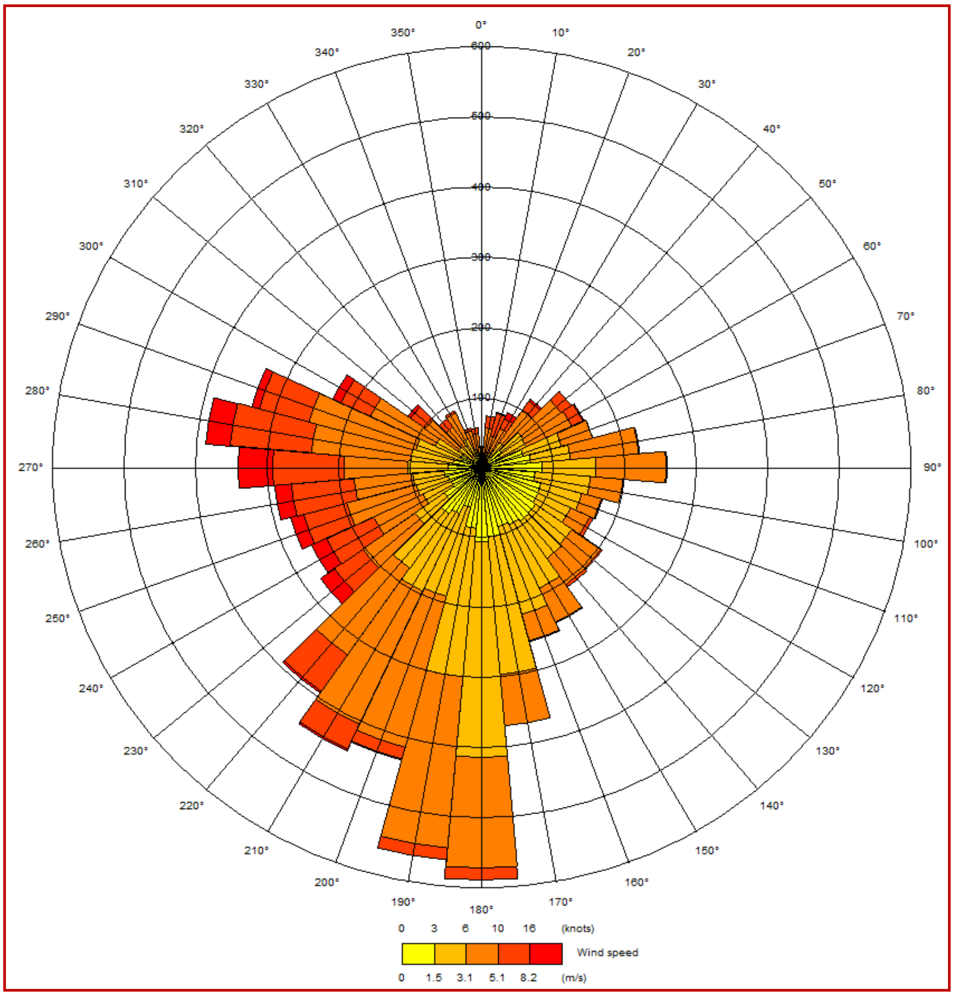
A site surface roughness value of 0.5 m was entered into the ADMS-roads model, consistent with the suburban nature of the modelled domain. In accordance with CERC's ADMS Roads user guide[15], a minimum Monin-Obukhov Length of 30 m will be used for the ADMS Roads model to reflect the suburban topography of the model domain.

One year of hourly sequential meteorological data from a representative synoptic station is required by the dispersion model. For the completion of the modelling, 2019 meteorological data from the Manchester weather station (located at Manchester Airport) has been used within this assessment. This particular site has been chosen due to it being the nearest site with a complete data set for 2019 and is representative of the High Peak area.

A wind rose for this site for the year 2019 is presented in

.

Figure 4.1 – Wind Rose for Manchester 2019 Meteorological Data



4.3 Modelled Sensitive Receptors

A total of 41 discrete receptors were included within the assessment to represent locations of relevant exposure. The locations were identified through completion of a desktop study, and primarily included places such as residential properties and schools. A description of the receptors is provided in Table 4.1, with their locations shown in Figure 4.2, Figure 4.3 and Figure 4.4.

[15] CERC (2020), ADMS-Roads User Guide Version 5. Available:

Table 4.1 – Modelled Receptor Locations

Receptor ID	X	Y	Height	Closest Address	Receptor Type
1	402685	397440	1.5	Woodhead Road	Residential
2	402718	397456	1.5		
3	402538	397356	1.5		
4	402509	397336	1.5		
5	402340	397301	1.5		
6	402240	397259	1.5		
7	402199	397277	1.5		
8	401797	394507	1.5	Dinting Vale	Residential
9	401780	394510	1.5		
10	401906	394458	1.5		
11	401962	394414	1.5		
12	402068	394345	1.5	Dinting C of E Primary School	Residential
13	402057	394335	1.5	Dinting Vale	Residential
14	402153	394269	1.5		
15	402121	394277	1.5		
16	406366	373609	1.5	Fairfield Road	Residential
17	406390	373717	1.5		
18	406411	373732	1.5		
19	406404	373760	1.5		
20	406380	373809	1.5		
21	406398	373842	1.5		
22	406379	373866	1.5		
23	406399	373901	1.5		
24	406451	373917	1.5		
25	406500	373941	1.5		
26	406551	373947	1.5		
27	406594	373948	1.5		
28	406598	373965	1.5		
29	406644	373982	1.5		
30	402402	394215	1.5	High Street West	Residential
31	402366	394186	1.5		
32	402501	394205	1.5		
33	402683	394096	1.5		
34	402792	394075	1.5		
35	402830	397491	1.5	Woodhead Road	Residential
36	402897	397538	1.5		
37	402055	397287	1.5	Manchester Road	Residential
38	401957	397278	1.5		
39	401877	397261	1.5		
40	401644	397244	1.5		
41	406301	373599	1.5	Fairfield Road	Residential

Figure 4.2 – Modelled Roads & Sensitive Receptors (AQMA 1 – Tintwistle)

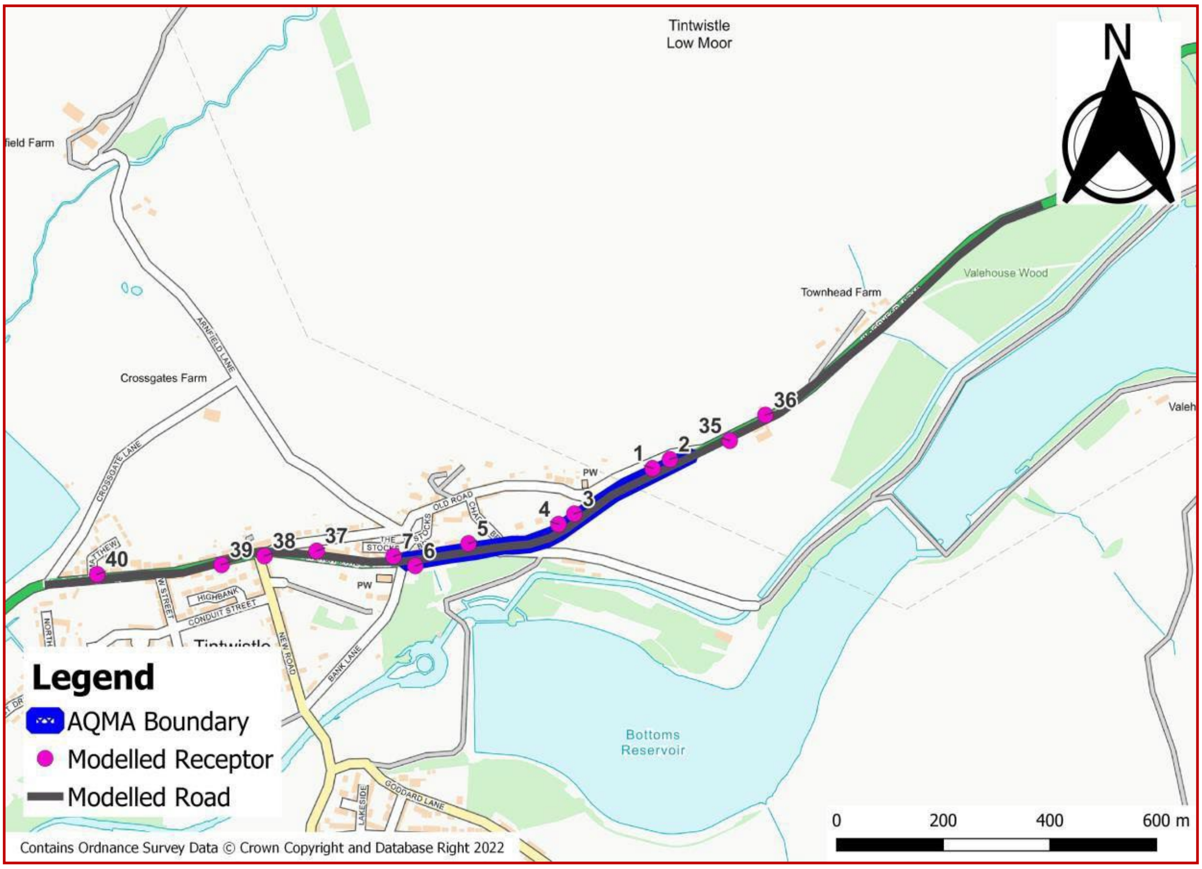


Figure 4.3 – Modelled Roads & Sensitive Receptors (AQMA 2 – Dinting Vale)

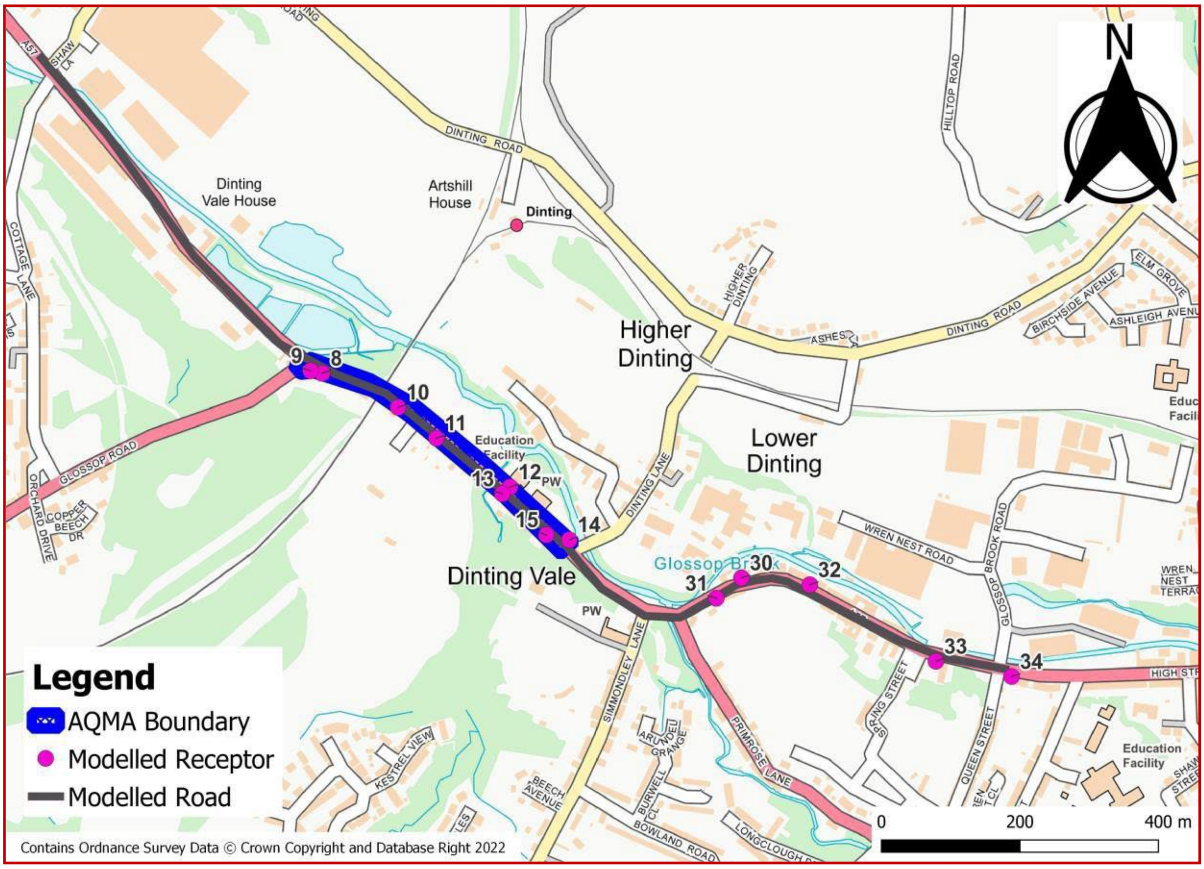
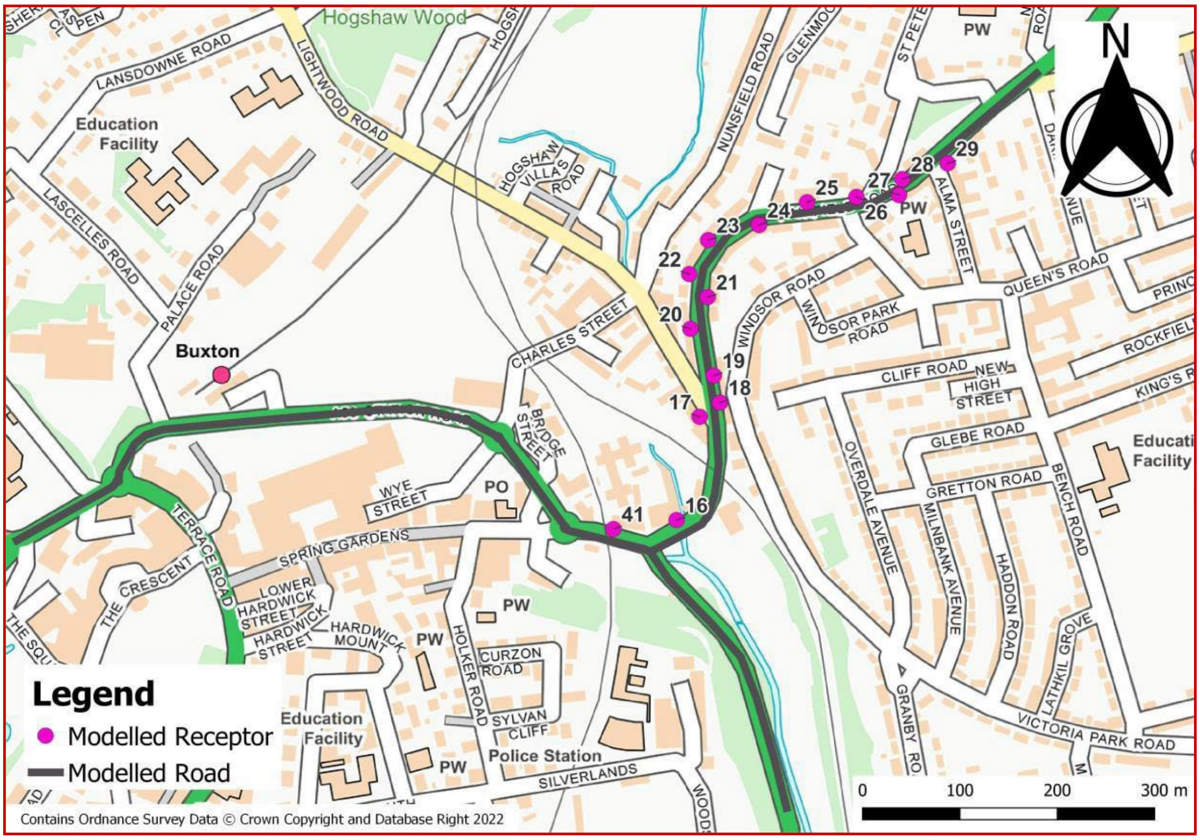


Figure 4.4 – Modelled Roads & Sensitive Receptors (Area of Concern – Fairfield Road)



4.4 Model Outputs

For the prediction of annual mean NO_2 concentration for the modelled scenarios, the output of the ADMS-Roads model for road NO_x contributions have been concentrated to total NO_2 following the methodology in LAQG TG(22), using the NO_x to NO_2 conversion tool developed on behalf of Defra. This assessment has utilised the most up-to-date version of the NO_x to NO_2 conversion tool, v8.1[16].

Verification of the model has been carried out using a number of local authority NO_2 passive monitoring locations, in accordance with the methodology detailed within LAQM TG(22). A separate verification was completed for each area of interest: AQMA 1, AQMA 2 and the area of concern along Fairfield Road. The diffusion tubes used for each verification are provided in Appendix B.

To help inform the development of measures as part of the action plan stage of the project, a NO_x source apportionment exercise was undertaken for the following vehicle classes:

- Petrol Cars
- Diesel Cars
- Petrol LGV
- Diesel LGV
- Rigid HGV
- Artic HGV
- Buses
- Motorcycle
- Full Hybrid Petrol Cars
- Plug-in Hybrid Petrol Cars
- Full Hybrid Diesel Cars
- Hybrid/ CNG Buses

[16] Defra, NO_x to NO_2 Calculator. (2020). Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/

Verification of the ADMS-Roads assessment has been undertaken using a number of local authority diffusion tube monitoring locations, and separate verifications have been undertaken for each AQMA. All NO_2 results presented in the assessment are those calculated following the process of model verification. Full details of the verification process are provided in Appendix B.

This provides vehicle contributions of NO_x as a proportion of the total NO_x concentration, which will allow the Council to develop specific AQAP measures targeting a reduction in emissions from specific vehicle types. Local fleet information has been derived from the DfT road traffic statistics.

It should be noted that emission sources of NO_2 are dominated by a combination of direct NO_2 (f- NO_2) and oxides of nitrogen (NO_x), the latter of which is chemically unstable and rapidly oxidised upon release to form NO_2. Reducing levels of NO_x emissions therefore reduces concentrations of NO_2. Consequently, the source apportionment study has firstly considered the emissions of NO_x, which are assumed to be representative of the main sources of NO_2, and secondly emissions of NO_2.

The source apportionment study has evaluated the following receptor combinations:

- The average NO_x and NO_2 contributions across all modelled locations. This provides useful information when considering possible action measures to test and adopt. It will however understate road NO_x concentrations in problem areas;

- The NO_x and NO_2 contributions at the receptor with the maximum road NO_x and NO_2 contribution. This provides a comparison to the previous two groups, with the identification of the most prominent vehicle source at receptor with the highest predicted NO_2 concentration.

4.5 Uncertainty

Due to the number of inputs that are associated with the modelling of the study area there is a level of uncertainty that has to be taken into account when drawing conclusions from the predicted concentrations of NO_2. The predicted concentrations are based upon the inputs of traffic data, background concentrations, emission factors, street canyon calculations, meteorological data, modelling terrain limitations and the availability of monitoring data from the assessment area(s).

4.5.1 Uncertainty in NO_x and NO_2 Trends

Recent studies have identified historical monitoring data within the UK that shows a disparity between measured concentration data and the projected decline in concentrations associated with emission forecasts for future years[17]. Ambient concentrations of NO_x and NO_2 have shown two distinct trends over the past twenty-five years: (1) a decrease in concentrations from around 1996 to 2002/04, followed by (2) a period of more stable concentrations from 2002/04 rather than the further decline in concentrations that was expected due to the improvements in vehicle emissions standards.

The reason for this disparity is related to the actual on-road performance of vehicles, in particular diesel cars and vans, when compared with calculations based on the Euro emission standards. Preliminary studies suggest the following:

- NO_x emissions from petrol vehicles appear to be in line with current projections and have decreased by 96% since the introduction of 3-way catalysts in 1993;

- NO_x emissions from diesel cars, under urban driving conditions, do not appear to have declined substantially, up to and including Euro 5. There is limited evidence that the same pattern may occur for motorway driving conditions; and

[17] Carslaw, D, Beevers, S, Westmoreland, E, Williams, M, Tate, J, Murrells, T, Steadman, J, Li, Y, Grice, S, Kent, A and Tsagatakis, I. 2011, Trends in NO_x and NO_2 emissions and ambient measurements in the UK, prepared for Defra, July 2011.

- NO_x emissions from HDVs equipped with Selective Catalytic Reduction (SCR) are much higher than expected when driving at low speeds.

This disparity in the historical national data highlights the uncertainty of future year projections of both NO_x and NO_2.

Defra and the Devolved Administrations have investigated these issues and have since published updated versions of the EFT that utilise COPERT 5 emission factors, which may go some way to addressing this disparity, but it is considered likely that a gap still remains. This assessment has utilised the latest EFT version 11.0 and associated tools published by Defra to help minimise any associated uncertainty when forming conclusions from the results.

5 Modelling Results

5.1 Modelled Concentrations

The results following the detailed modelling assessment have been split into the following areas:

- AQMA 1 (Tintwistle);
- AQMA 2 (Dinting Vale); and
- Area of Concern (Fairfield Road).

5.1.1 AQMA 1 (Tintwistle) – Baseline 2019 NO_2 Concentrations

The assessment has considered emissions of NO_2 from road traffic at 13 existing receptor locations representing locations of relevant exposure. Table 5.1 provides a summary of the modelled receptors split into groups based on the predicted annual mean NO_2 concentration. It can be seen that of the 13 discrete receptors, 3 recorded NO_2 annual mean concentrations in the range of 32 – 36 µg/m^3. The remaining 10 receptors all measured concentrations below 32 µg/m^3.

Table 5.1 – AQMA 1, Modelled Receptors NO_2 Annual Mean Concentration

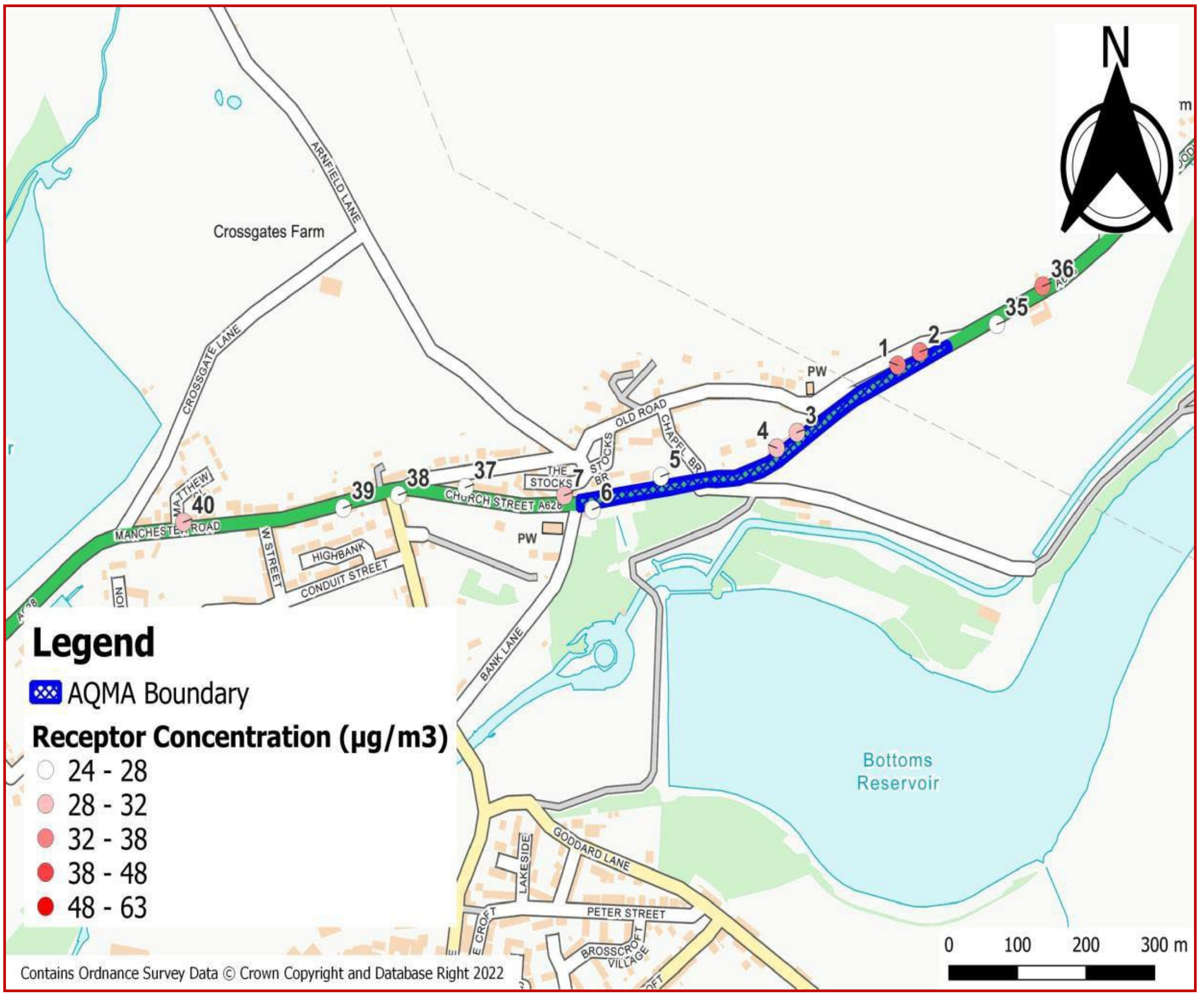
Modelled NO_2 Concentration (µg/m^3)	Number of Receptors	Reference to the AQS Objective	Number of Receptors	% of Receptors
>60	0	**Above 60 µg/m^3**	0	0%
44 - 60	0	**Above 40 µg/m^3 AQS Objective**	0	0%
40 - 44	0			
36 - 40	0	Within 10% of AQS Objective	0	0%
32 - 36	3	Below 36 µg/m^3 AQS Objective	13	100%
<32	10			

The highest annual mean NO_2 concentration was recorded at Receptor 1 with a concentration of 33.7 µg/m^3. This is consistent with the monitoring in the area, as diffusion tube site HP5 which is located directly next to receptor, monitored an NO_2 concentration of 37.4 µg/m^3. The empirical relationship given in LAQM.TG(22) states that exceedance of the 1-hour mean objective for NO_2 is only likely to occur where annual mean concentrations are 60µg/m^3 or above. Given that the NO_2 annual mean concentration recorded at Receptor 1 is significantly below the hourly exceedance indicator (60 µg/m^3), an exceedance of the hourly NO_2 AQS objective is unlikely at this location. This is also the case for other monitoring locations in the AQMA, where the NO_2 annual mean concentration in 2019 was recorded as 30.0 µg/m^3 (HP6) and 35.5 µg/m^3 (HP8).

Figure 5.1 shows the NO_2 concentrations modelled at each receptor location. Based on the results, the following conclusions were made for AQMA 1 (Tintwistle):

- No exceedances of the NO_2 annual mean objective were recorded within the current AQMA designation.
- The low concentrations are likely the result of pollutant concentrations dispersing over the open fields directly adjacent to the modelled road (A628).

Figure 5.1 – AQMA 1, Modelled Receptors NO_2 Annual Mean Concentration



5.1.2 AQMA 2 (Dinting Vale) – Baseline 2019 NO_2 Concentrations

The assessment has considered emissions of NO_2 from road traffic at 13 existing receptor locations representing locations of relevant exposure. Table 5.2 provides a summary of the modelled receptors split into groups based on the predicted annual mean NO_2 concentration. It can be seen that of the 13 discrete receptors, 3 recorded NO_2 annual mean concentrations above the 40 µg/m^3 annual mean objective, whilst a further 3 receptor locations recorded concentrations within 10% of the AQS objective. The remaining 7 sites recorded concentrations below 36 µg/m^3.

Table 5.2 – AQMA 2, Modelled Receptors NO_2 Annual Mean Concentration

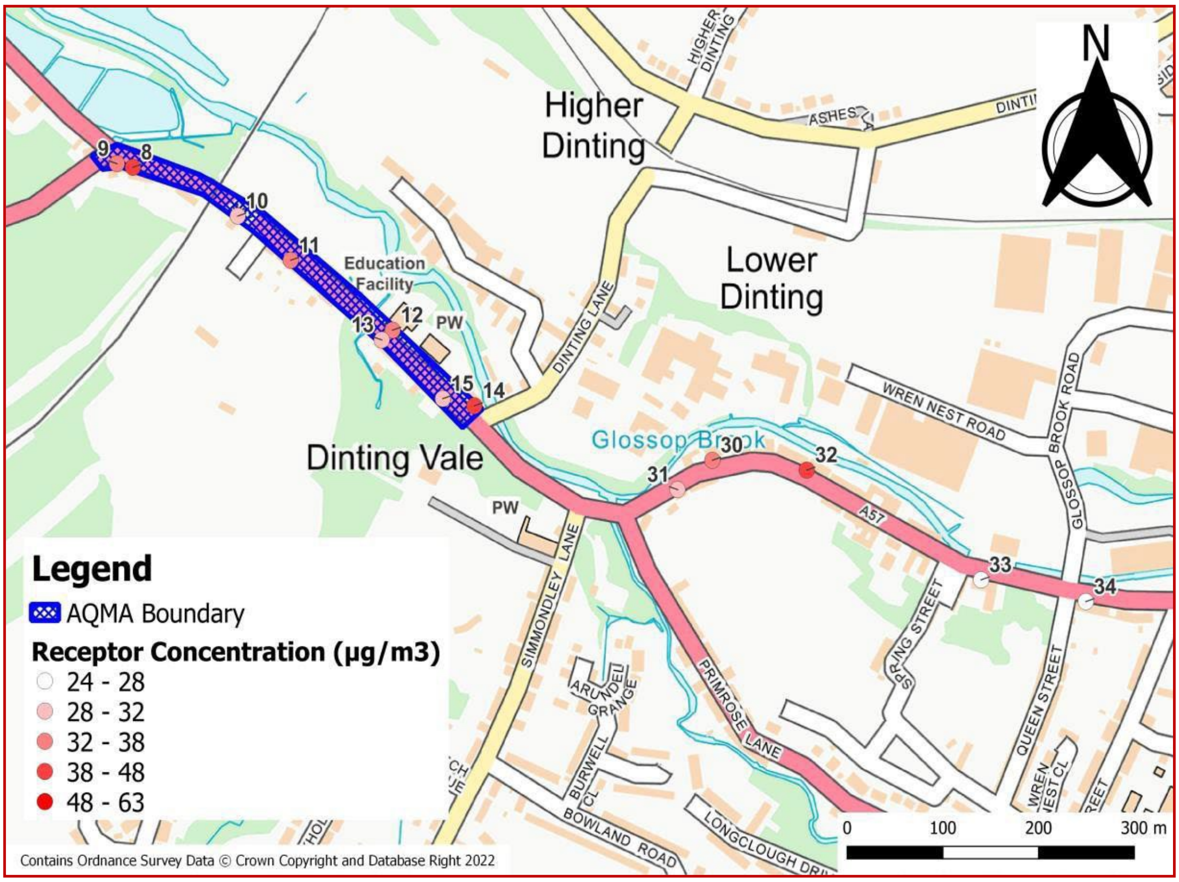
Modelled NO_2 Concentration (µg/m^3)	Number of Receptors	Reference to the AQS Objective	Number of Receptors	% of Receptors
>60	0	**Above 60 µg/m^3**	0	0
44 - 60	2	**Above 40 µg/m^3 AQS Objective**	3	23%
40 - 44	1			
36 - 40	3	Within 10% of AQS Objective	3	23%
32 - 36	1	Below 36 µg/m^3 AQS Objective	7	54%
<32	6			

The highest annual mean NO_2 concentration was recorded at Receptor 8 with a concentration of 48.0 µg/m³. This is consistent with the monitoring in the area, as diffusion tube site HP25 which is located next to the receptor, monitored an NO_2 concentration of 46.3 µg/m³. The empirical relationship given in LAQM.TG(22) states that exceedance of the 1-hour mean objective for NO_2 is only likely to occur where annual mean concentrations are 60 µg/m³ or above. Given that the NO_2 annual mean concentration recorded at Receptor 8 is below the hourly exceedance indicator (60 µg/m³), an exceedance of the hourly NO_2 AQS objective is unlikely at this location. This is also the case for the other monitoring location within the AQMA, HP28, where an NO_2 concentration of 38.9 µg/m³ was recorded.

Figure 5.2 shows the NO_2 concentrations modelled at each receptor location. Based on the results, the following results were made for AQMA 2 (Dinting Vale):

- Exceedances were recorded at multiple receptor locations within the AQMA, with the NO_2 annual mean concentration being over 8 µg/m³ above the AQS objective (48 µg/m³).
- As exceedances were also predicted outside of the existing AQMA boundary, the Council should expand the diffusion tube network along High Street West, to provide supporting evidence for whether the AQMA boundary needs to be extended.
- The AQMA boundary should remain in place based on the modelled concentrations.

Figure 5.2 – AQMA 2, Modelled Receptors NO_2 Annual Mean Concentration



5.1.3 Area of Concern (Fairfield Road) – Baseline 2019 NO_2 Concentrations

The assessment has considered emissions of NO_2 from road traffic at 15 existing receptor locations representing locations of relevant exposure. Table 5.3 provides a summary of the modelled receptors split into groups based on the predicted annual mean NO_2 concentration. It can be seen that of the 15 discrete receptors, 13 recorded an NO_2 annual mean concentration in exceedance of the 40 µg/m^3 AQS objective. Of these, 1 receptor recorded an NO_2 annual mean concentration greater than 60 µg/m^3. The remaining 2 receptors recorded concentrations below 36 µg/m^3.

The receptor that exceeded 60 µg/m^3 (Receptor 26) is located at the junction between Fairfield Road and St. Peters Road, and the junction between Fairfield Road and Queens Road. These modelled concentrations are similar to the diffusion tube concentrations, which also exceeded the NO_2 annual mean objective at multiple locations in the area of concern along Fairfield Road.

Table 5.3 – Area of Concern, Modelled Receptors NO_2 Annual Mean Concentration

Modelled NO_2 Concentration (µg/m^3)	Number of Receptors	Reference to the AQS Objective	Number of Receptors	% of Receptors
>60	1	**Above 60 µg/m^3**	1	7%
44 - 60	10	**Above 40 µg/m^3 AQS Objective**	12	80%
40 - 44	2			
36 - 40	0	Within 10% of AQS Objective	0	0%
32 - 36	1	Below 36 µg/m^3 AQS Objective	2	13%
<32	1			

The highest annual mean NO_2 concentration was recorded at Receptor 26 with a concentration of 63.0 µg/m^3. The empirical relationship given in LAQM.TG(22) states that exceedance of the 1-hour mean objective for NO_2 is only likely to occur where annual mean concentrations are 60µg/m^3 or above. Given that the NO_2 annual mean concentration recorded at Receptor 26 is above the hourly exceedance indicator (60 µg/m^3), an exceedance of the hourly NO_2 AQS objective is likely at this location.

As the predicted concentration at receptor 26 exceeded 60 µg/m^3, a short-term assessment was completed. This is because, as stated in section 7.97 of TG(22):

"A study carried out on behalf of Defra and the Devolved Administrations identified that exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m^3"

Therefore, it can be inferred that an annual mean concentration above 60 µg/m^3, is an indication that the 1-hour mean objective has the potential to be exceeded. As a result, a short-term assessment was completed. The background concentration used in this short-term assessment was double that used in the long-term assessment, as the assessment guidance[18] states that:

"When you calculate background concentration, you can assume that the short-term background concentration of a substance is twice its long-term concentration".

The results of the short-term assessment are presented below in Table 5.4.

Table 5.4 – Short-Term Assessment, Maximum 1-Hour NO_2 Mean

Receptor ID	Annual Mean (µg/m^3)	Maximum 1-Hour NO_2 (µg/m^3)
26 (Residential property at the junction between Fairfield Road and St. Peters Road)	63.0	136.4

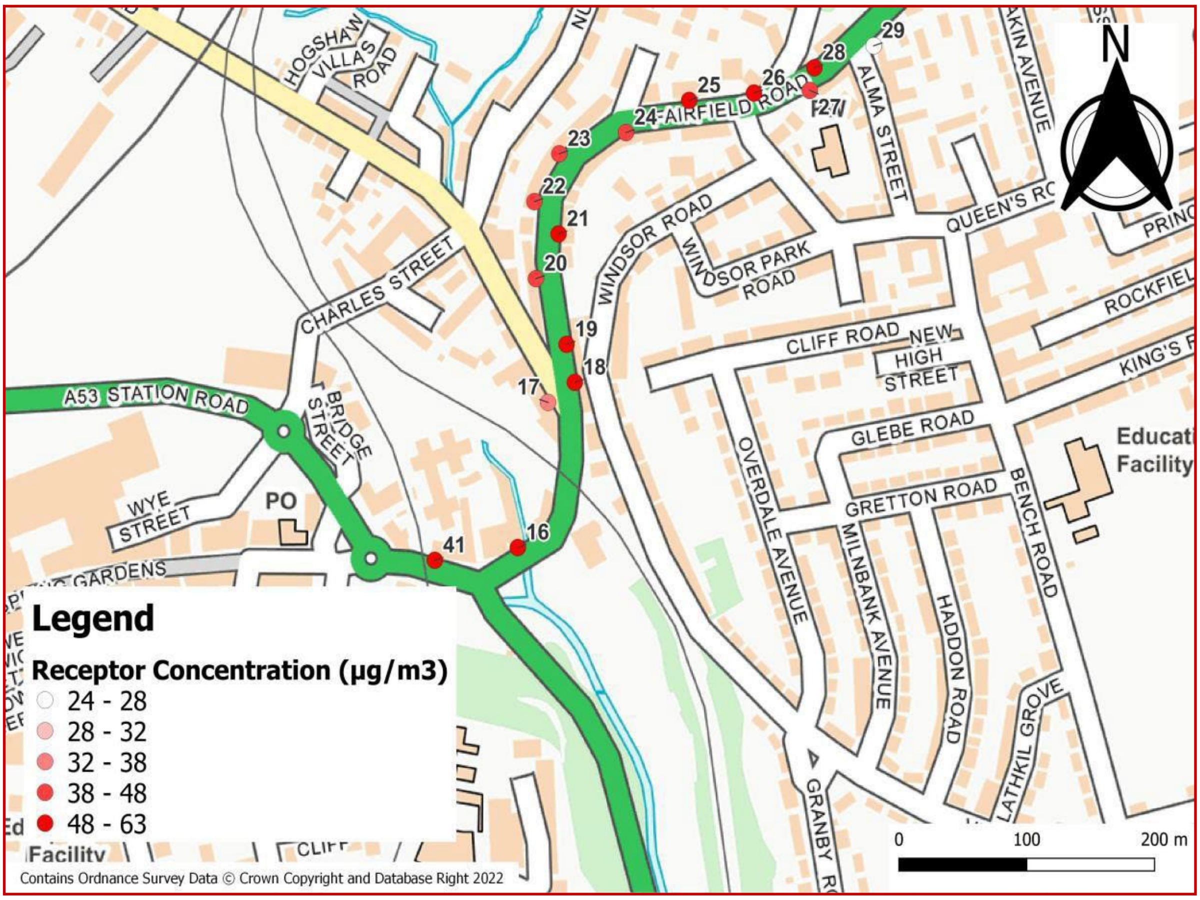
The maximum 1-hour mean concentration was predicted to be 136.4 µg/m^3 at the max receptor. As such, it is not considered that the 1-hour mean would be exceeded 200 µg/m^3 on more than the 18 occasions and the short-term AQS objective would not be exceeded.

[18] Environment Agency & Defra. (2022). Guidance – Air emissions risk assessment for your environmental permit. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Figure 5.3 shows the NO_2 concentrations modelled at each receptor location. Based on the results, the following results were made for the area of concern (Fairfield Road):

- Exceedances were recorded at multiple receptor locations, with the AQS annual mean objective being exceeded at 87% of receptor locations.
- The council should expand the diffusion tube monitoring network in the area along Fairfield Road, and consider declaring an AQMA should the monitoring suggest consistent exceedances of the NO_2 annual mean objective.

Figure 5.3 – Area of Concern, Modelled Receptors NO_2 Annual Mean Concentration



5.1.4 AQMA 1 (Tintwistle) – Baseline 2019 PM_{10}/$PM_{2.5}$ Concentrations

The assessment has considered emissions of PM_{10} and $PM_{2.5}$ from road traffic at 13 existing receptor locations representing locations of relevant exposure.

All of the 13 discrete receptors are predicted to be well below the PM_{10} and $PM_{2.5}$ annual mean AQS objective limit of 40 µg/m^3 and 20 µg/m^3, respectively. The highest annual mean PM_{10} and $PM_{2.5}$ concentration was recorded at Receptor 1 with a PM_{10} concentration of 14.0 µg/m^3 and a $PM_{2.5}$ concentration of 9.2 µg/m^3.

5.1.5 AQMA 2 (Dinting Vale) – Baseline 2019 PM_{10}/$PM_{2.5}$ Concentrations

The assessment has considered emissions of PM_{10} and $PM_{2.5}$ from road traffic at 13 existing receptor locations representing locations of relevant exposure.

All of the 13 discrete receptors are predicted to be well below the PM_{10} and $PM_{2.5}$ annual mean AQS objective limit of 40 µg/m^3 and 25 µg/m^3, respectively. The highest annual mean PM_{10} and $PM_{2.5}$ concentration was recorded at Receptor 32 with a PM_{10} concentration of 14.4 µg/m^3 and a $PM_{2.5}$ concentration of 9.4 µg/m^3.

5.1.6 Area of Concern (Fairfield Road) – Baseline 2019 PM_{10}/$PM_{2.5}$ Concentrations

The assessment has considered emissions of PM_{10} and $PM_{2.5}$ from road traffic at 15 existing receptor locations representing locations of relevant exposure.

All of the 15 discrete receptors are predicted to be well below the PM_{10} and $PM_{2.5}$ annual mean AQS objective limit of 40 µg/m^3 and 20 µg/m^3, respectively. The highest annual mean PM_{10} and $PM_{2.5}$ concentration was recorded at Receptor 28 with a PM_{10} concentration of 19.3 µg/m^3 and a $PM_{2.5}$ concentration of 11.8 µg/m^3.

5.2 Estimated Year of Compliance

Following the identification of exceedances of the AQS objectives (in AQMA 2 and the area of concern), it is useful to provide an estimate of the year by which concentrations at the identified locations of exceedances will become compliant with the relevant AQS objective. This is initially provided below assuming only the trends for future air quality, as currently predicted by Defra, are realised. The implementation of specific intervention measures to mitigate the local air quality issues, as are currently being developed by the Council within an AQAP, would then be considered most likely to bring forwards the estimated date of compliance.

Following the methodology outlined in LAQM.TG(22) paragraph 7.75 onward, the year by which concentrations at the identified locations of exceedances will become compliant with the NO_2 annual mean AQS objective has been estimated. This has been completed using the predicted modelled NO_2 concentrations from the 2019 Base scenario.

5.2.1 AQMA 2 (Dinting Vale), Estimated Year of Compliance

As a worst-case approach, the projection is based upon the receptor predicted as having the maximum annual mean NO_2 concentration, which in this case is Receptor 8. The appropriate roadside NO_2 projection factors, as provided on the LAQM Support website[19], are then applied to this concentration value to ascertain the estimated NO_2 annual mean reduction per annum, and hence the anticipated year of compliance. In this case, roadside projection factors for 'Rest of UK (HDV <10%)' have been applied, consistent with the worst-case receptor location.

The projected NO_2 annual mean concentrations following the above approach are presented in Table 5-5.

Table 5.5 – AQMA 2 (Dinting Vale), Estimated Year of Compliance

Receptor 8											
2019 Annual Mean Concentration (µg/m^3)	Predicted Annual Mean Concentration (µg/m^3)										
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
48.0	**45.6**	**43.1**	**40.6**	38.5	36.5	34.6	32.9	31.3	30.0	28.8	27.7
In **bold**, exceedance of the NO_2 annual mean AQS objective of 40 µg/m^3											

Table 5-5 indicates that the first year by which Receptor 8 will be exposed to a concentration below the annual mean NO_2 AQS objective will be 2023. Additionally, it is expected that concentrations are expected to drop below 10% of the annual mean NO_2 AQS objective by 2025. 2023 is therefore considered the predicted year of compliance for those receptors used within the model, which are believed to represent worst case exposure within AQMA 2 (Dinting Vale), in the absence of the implementation of any specific intervention measures to further bring forward local air quality improvements in the area.

[19] LAQM – NO_2 Projection Factors. Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/roadside-no2-projection-factors/

Table 5.6 also illustrates the required reduction in emissions for annual mean NO_2 concentrations to fall below the AQO of 40 µg/m^3. As shown a 38.1% reduction in road NO_x is required to meet the AQO for annual mean NO_2 at the worst-case receptor in AQMA 2 (Dinting Vale).

Table 5.6 – AQMA 2 (Dinting Vale), Required Reduction in Emissions

Metric	Value (Concentrations as µg/m^3)
Current Road NO_x	81.6
Road NO_x – Required to Achieve NO_2 Concentration of 39.9 µg/m^3	50.5
Required Road NO_x Reduction	31.1
Required % Reduction	**38.1%**

5.2.2 Area of Concern (Fairfield Road), Estimated Year of Compliance

As a worst-case approach, the projection is based upon the receptor predicted as having the maximum annual mean NO_2 concentration, which in this case is Receptor 26. The appropriate roadside NO_2 projection factors, as provided on the LAQM Support website, are then applied to this concentration value to ascertain the estimated NO_2 annual mean reduction per annum, and hence the anticipated year of compliance. In this case, roadside projection factors for 'Rest of UK (HDV <10%)' have been applied, consistent with the worst-case receptor location.

The projected NO_2 annual mean concentrations following the above approach are presented in Table 5-7.

Table 5.7 – Area of Concern (Fairfield Road), Estimated Year of Compliance

Receptor 26											
2019 Annual Mean Concentration (µg/m^3)	Predicted Annual Mean Concentration (µg/m^3)										
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
63.0	**59.9**	**56.5**	**53.3**	**50.6**	**47.9**	**45.3**	**43.2**	**41.1**	39.3	37.7	36.4
In **bold**, exceedance of the NO_2 annual mean AQS objective of 40 µg/m^3											

Table 5-7 indicates that the first year by which Receptor 26 will be exposed to a concentration below the annual mean NO_2 AQS objective will be 2028. Additionally, it is expected that concentrations are expected to drop below 10% of the annual mean NO_2 AQS objective after 2030. 2023 is therefore considered the predicted year of compliance for those receptors used within the model, which are believed to represent worst case exposure within the area of concern along Fairfield Road, in the absence of the implementation of any specific intervention measures to further bring forward local air quality improvements in the area.

Table 5.8 also illustrates the required reduction in emissions for annual mean NO_2 concentrations to fall below the AQO of 40 µg/m^3. As shown a 59.0% reduction in road NO_x is required to meet the AQO for annual mean NO_2 at the worst-case receptor in the area of concern along Fairfield Road.

- **Table 5.8 – Area of Concern (Fairfield Road), Required Reduction in Emissions**

Metric	Value (Concentrations as µg/m^3)
Current Road NO_x	123.1
Road NO_x – Required to Achieve NO_2 Concentration of 39.9 µg/m^3	50.5
Required Road NO_x Reduction	72.6
Required % Reduction	**59.0%**

5.3 Source Apportionment

To help inform the development of measures as part of the action plan stage of the project, a NO_x source apportionment exercise was undertaken for the following vehicle classes:

- Petrol Cars
- Diesel Cars
- Petrol LGV
- Diesel LGV
- Rigid HGV
- Artic HGV
- Buses
- Motorcycle
- Full Hybrid Petrol Cars
- Plug-in Hybrid Petrol Cars
- Full Hybrid Diesel Cars
- Hybrid/ CNG Buses

This will provide vehicle emission proportions of NO_x that will allow the Council to design specific AQAP measures targeting a reduction in emissions from specific vehicle types for each of the AQMAs.

It should be noted that emission sources of NO_2 are dominated by a combination of direct NO_2 (f- NO_2) and oxides of nitrogen (NO_x), the latter of which is chemically unstable and rapidly oxidised upon release to form NO_2. Reducing levels of NO_x emissions therefore reduces levels of NO_2. As a consequence, the source apportionment study has considered the emissions of NO_x which are assumed to be representative of the main sources of NO_2.

The sections below detail the source apportionment results for NO_x concentrations at modelled receptors for three scenarios:

- The average Total NO_x split across all modelled receptors. This provides useful information to understand the split between local and regional background sources as well as local road sources. In accordance with TG(22). Regional background is considered to be the emissions from background sources that the authority is unable to influence and the local background the background emissions they have some influence over. Local sources give rise to the hotspot areas of exceedances, and the principal sources for the local authority.

- The average NO_x contributions within the AQMA. This will inform potential prominent NO_x contributors present within the identified area of exceedance and therefore be useful when testing and adopting action measures; and,

- The location where the maximum road NO_x concentration has been predicted within the AQMA. This is likely to be in the area of most concern within the proposed AQMA and so a good place to test and adopt action measures. Any gains predicted by action measures are however likely to be greatest at this location and so would not represent gains across the whole modelled area.

5.3.1 AQMA 1 (Tintwistle), Source Apportionment

When considering the average NO_x background split across all modelled receptor locations, the following observations were found:

- Regional Background NO_x accounted for 25.6% (5.1 µg/m^3).

- Local Background NO_x accounted for 37.5% (7.5 µg/m^3).

- Local Road Traffic accounted for 36.9% (7.3 µg/m^3).

When considering the average NO_x concentration across all modelled receptor locations, the following observations were found:

- Road traffic accounts for 36.9% (7.3 µg/m^3) of total NO_x, with background accounting for 63.1% (12.5 µg/m^3).
- Of the total road NO_x, diesel LGVs are the highest contributing vehicle class, accounting for 32.9%.
- Diesel cars are found to be the second highest contributing vehicle class, accounting for 31.6%.
- Artic HGVs are the third highest contributing vehicle class, accounting for 14.7%, followed closely by rigid HGVs which account for 14.5% of total road NO_x.
- Petrol cars (4.4%) and buses (1.5%) are the next highest contributors, with the remaining vehicle classes all accounting for less than 0.2% of the total road NO_x.

When considering the modelled receptor location at which the maximum road NO_x concentration has been predicted, the following observations were found:

- Road traffic accounts for 79.6% (48.3 µg/m^3) of total NO_x, highlighting contributions from road traffic to be the core component in areas of exceedance.
- Of the total road NO_x, diesel LGVs are found to be the highest contributing vehicle class, accounting for 37.3%. This is higher than the contribution across all modelled receptors.
- Diesel cars are found to be the second highest contributing vehicle class, accounting for 31.4%.
- Rigid HGVs account for 14.7% of the total road NO_x, whilst artic HGVs account for 11.0%.
- Petrol cars contribute 4.4% and buses account for 0.7%, with the remaining vehicle classes all accounting for less than 0.2% of the total road NO_x.

The results of the source apportionment exercise for AQMA 1 (Tintwistle) are shown in Table 5.9 and Table 5.10.

Figure 5.4 provides a graphical representation of the split in background concentrations and local road source.

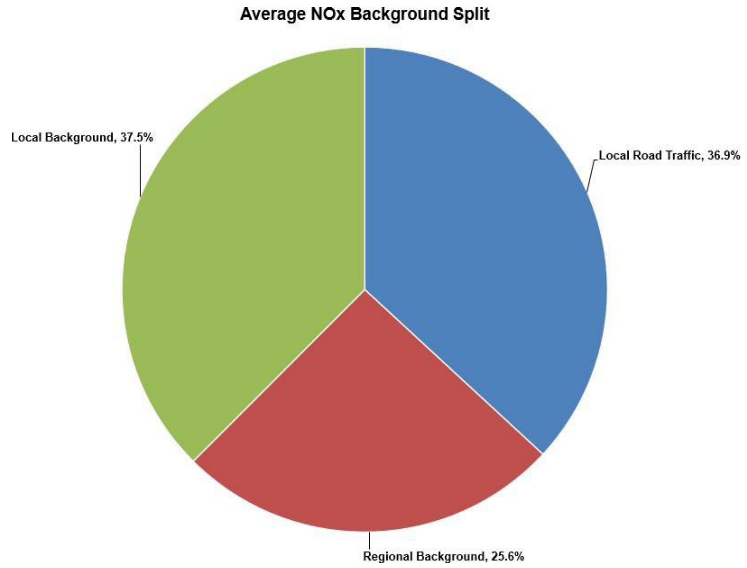
Table 5.9 – AQMA 1 (Tintwistle), Total NO_x Source Apportionment

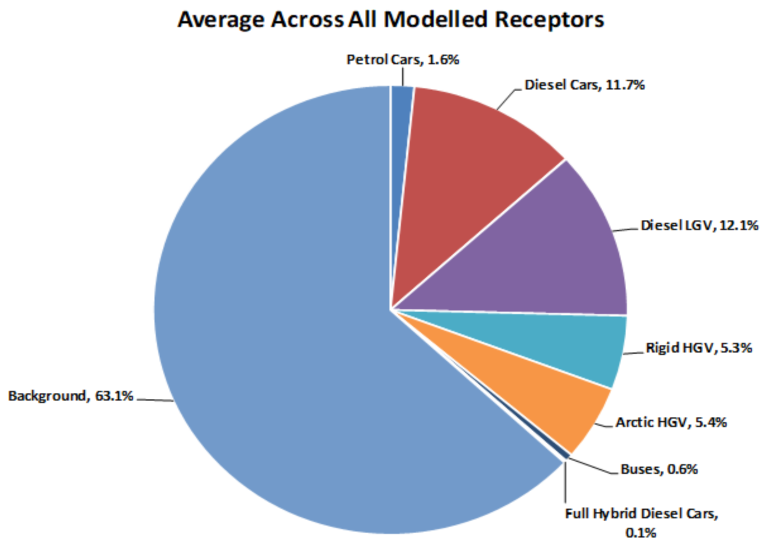
Results	Local Background NO_x	Regional Background NO_x	Local Road NO_x
NO_x Concentration (µg/m^3)	7.3	5.1	7.5
Percentage of Total NO_x	36.9%	25.6%	37.5%

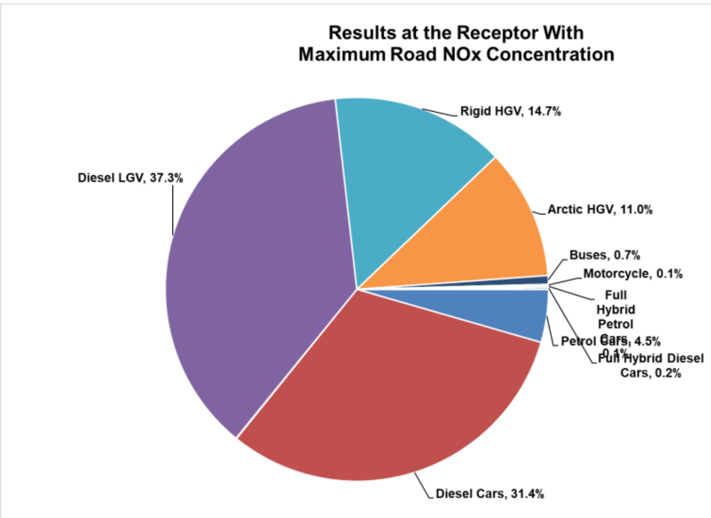
Table 5.10 – AQMA 1 (Tintwistle), Detailed NO_x Source Apportionment

Metric	All	Petrol Car	Diesel Car	Petrol LGV	Diesel LGV	Rigid HGV	Arctic HGV	Bus	Motor-cycle	Full Hybrid Petrol Car	Plug-In Hybrid Petrol Car	Full Hybrid Diesel Car	Hybrid Bus	Backgr ound
Average Across All Modelled Receptors														
NOx (µg/m^3)	7.3	0.3	2.3	0.0	2.4	1.1	1.1	0.1	0.0	0.0	0.0	0.0	0.0	12.5
% of Total NO_x	36.9	1.6	11.7	0.0	12.1	5.3	5.4	0.6	0.0	0.0	0.0	0.1	0.0	63.1
% contribution to Road NO_x	100.0	4.4	31.6	0.0	32.9	14.5	14.7	1.5	0.1	0.1	0.0	0.2	0.1	-
At Receptor With Maximum Road NOx Contribution														
NOx (µg/m^3)	48.3	2.2	15.1	0.0	18.0	7.1	5.3	0.4	0.1	0.0	0.0	0.1	0.0	12.4
% of Total NO_x	79.6	3.5	24.9	0.0	29.7	11.7	8.7	0.6	0.1	0.1	0.0	0.1	0.0	20.4
% contribution to Road NOx	100.0	4.5	31.4	0.0	37.3	14.7	11.0	0.7	0.1	0.1	0.0	0.2	0.0	-

Figure 5.4 – AQMA 1 (Tintwistle), Detailed NOx Source Apportionment







5.3.2 AQMA 2 (Dinting Vale), Source Apportionment

When considering the average NO_x background split across all modelled receptor locations, the following observations were found:

- Regional Background NO_x accounted for 8.0% (5.1 µg/m^3).
- Local Background NO_x accounted for 12.1% (7.8 µg/m^3).
- Local Road Traffic accounted for the largest majority, 79.9% (51.1 µg/m^3).

When considering the average NO_x concentration across all modelled receptor locations, the following observations were found:

- Road traffic accounts for 79.9% (51.1 µg/m^3) of total NO_x, with background accounting for 20.1% (12.8 µg/m^3).
- Of the total road NO_x, diesel cars are the highest contributing vehicle class, accounting for 46.9%.
- Diesel LGVs are found to be the second highest contributing vehicle class, accounting for 26.0%.
- Rigid HGVs are the third highest contributing vehicle class, accounting for 11.9%.
- Petrol cars (6.2%), buses (5.7%) and artic HGVs (2.8%) are the next greatest contributors to total road NO_x.
- The remaining vehicle classes all account for less than 0.3% of the total road NO_x.

When considering the modelled receptor location at which the maximum road NO_x concentration has been predicted, the following observations were found:

- Road traffic accounts for 86.3% (81.6 µg/m^3) of total NO_x, highlighting contributions from road traffic to be the core component in areas of exceedance.
- Of the total road NO_x, diesel cars are found to be the highest contributing vehicle class, accounting for 35.4%.
- Rigid HGVs are found to be the second highest contributing vehicle class, accounting for 23.5%.
- Diesel LGVs are the third highest contributing vehicle class, accounting for 20.6%.
- Buses (9.0%), artic HGVs (6.9%) and petrol cars (4.3%) are the next biggest contributors, with the remaining vehicle classes all accounting for less than 0.2% of the total road NO_x.

The results of the source apportionment exercise for AQMA 2 (Dinting Vale) are presented in Table 5.11 and Table 5.12.

Figure 5.5 provides a graphical representation of the split in background concentrations and local road source.

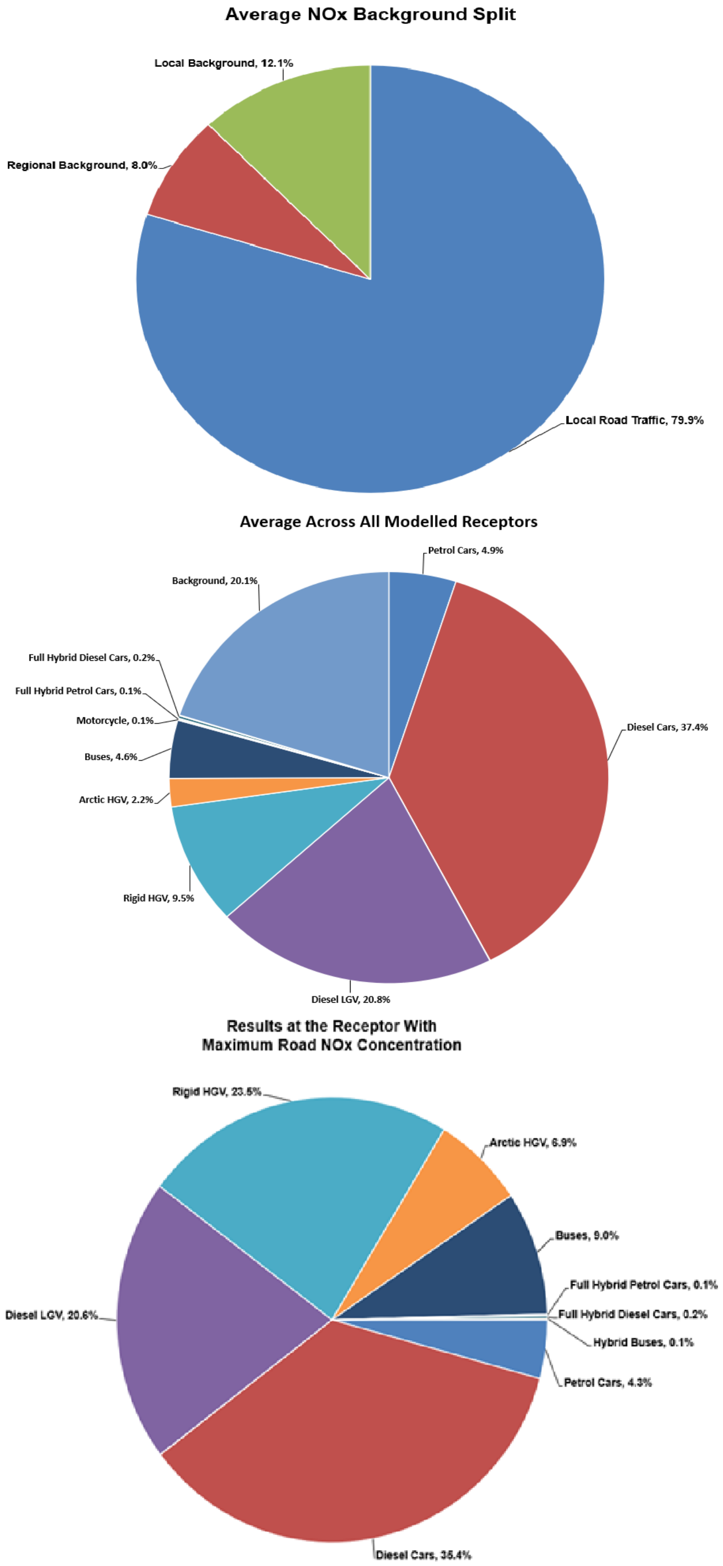
Table 5.11 – AQMA 2 (Dinting Vale), Total NO_x Source Apportionment

Results	Local Background NO_x	Regional Background NO_x	Local Road NO_x
NO_x Concentration (µg/m^3)	7.8	5.1	51.1
Percentage of Total NO_x	12.1%	8.0%	79.9%

Table 5.12 – AQMA 2 (Dinting Vale), Detailed NO_x Source Apportionment

Metric	All	Petrol Car	Diesel Car	Petrol LGV	Diesel LGV	Rigid HGV	Arctic HGV	Bus	Motor-cycle	Full Hybrid Petrol Car	Plug-In Hybrid Petrol Car	Full Hybrid Diesel Car	Hybrid Bus	Background
Average Across All Modelled Receptors														
NOx (µg/m^3)	51.1	3.2	23.9	0.0	13.3	6.1	1.4	2.9	0.0	0.1	0.0	0.1	0.0	12.8
% of Total NO_x	79.9	4.9	37.4	0.0	20.8	9.5	2.2	4.6	0.1	0.1	0.0	0.2	0.0	20.1
% contribution to Road NO_x	100.0	6.2	46.9	0.0	26.0	11.9	2.8	5.7	0.1	0.1	0.0	0.3	0.1	-
At Receptor With Maximum Road NOx Contribution														
NOx (µg/m^3)	81.6	3.5	28.9	0.0	16.8	19.2	5.6	7.3	0.0	0.1	0.0	0.2	0.1	12.9
% of Total NO_x	86.3	3.7	30.6	0.0	17.8	20.3	5.9	7.8	0.0	0.1	0.0	0.2	0.1	13.7
% contribution to Road NOx	100.0	4.3	35.4	0.0	20.6	23.5	6.9	9.0	0.0	0.1	0.0	0.2	0.1	-

▪ **Figure 5.5 – AQMA 2 (Dinting Vale), Detailed NOx Source Apportionment**



5.3.3 Area of Concern (Fairfield Road), Source Apportionment

When considering the average NO_x background split across all modelled receptor locations, the following observations were found:

- Regional Background NO_x accounted for 15.7% (5.2 µg/m^3).
- Local Background NO_x accounted for 25.1% (8.3 µg/m^3).
- Local Road Traffic accounted for the largest majority, 59.2% (19.6 µg/m^3).

When considering the average NO_x concentration across all modelled receptor locations, the following observations were found:

- Road traffic accounts for 59.2% (19.6 µg/m^3) of total NO_x, with background accounting for 40.8% (13.5 µg/m^3).
- Of the total road NO_x, diesel cars are the highest contributing vehicle class, accounting for 43.5%.
- Diesel LGVs are found to be the second highest contributing vehicle class, accounting for 21.8%.
- Rigid HGVs are the third highest contributing vehicle class, accounting for 13.3%.
- Artic HGVs are the next greatest contributor, accounting for 10.3% of the total road NOx.
- Petrol cars (5.6%) and buses (5.0%) are the next greatest contributor, with the remaining vehicle classes all accounting for less than 0.2% of the total road NOx contribution.

When considering the modelled receptor location at which the maximum road NO_x concentration has been predicted, the following observations were found:

- Road traffic accounts for 90.1% (123.1 µg/m^3) of total NO_x, highlighting contributions from road traffic to be the core component in areas of exceedance.
- Of the total road NO_x, diesel cars are found to be the highest contributing vehicle class, accounting for 42.0%.
- Diesel LGVs are the second highest contributing vehicle class, accounting for 20.4%.
- Rigid HGVs are the next greatest contributor at 14.8%, followed by artic HGVs at 12.1%.
- Petrol cars (5.3%) and buses (5.0%) are the next biggest contributing vehicle class to total road NOx, with the remaining vehicle classes all accounting for less than 0.2%.

The results of the source apportionment exercise for the area of concern (Fairfield Road) are presented in Table 5.13 and Table 5.14.

Figure 5.6 provides a graphical representation of the split in background concentrations and local road source.

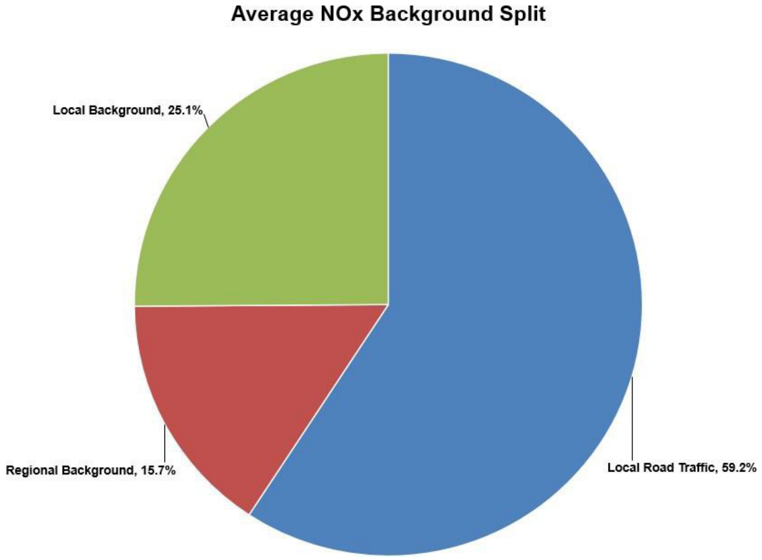
Table 5.13 – Area of Concern (Fairfield Road), Total NO_x Source Apportionment

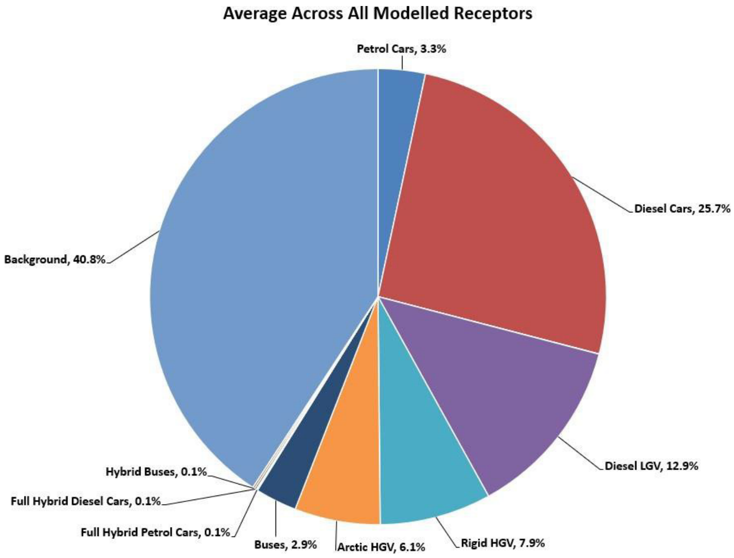
Results	Local Background NO_x	Regional Background NO_x	Local Road NO_x
NO_x Concentration (µg/m^3)	8.3	5.2	19.6
Percentage of Total NO_x	25.1%	15.7%	59.2%

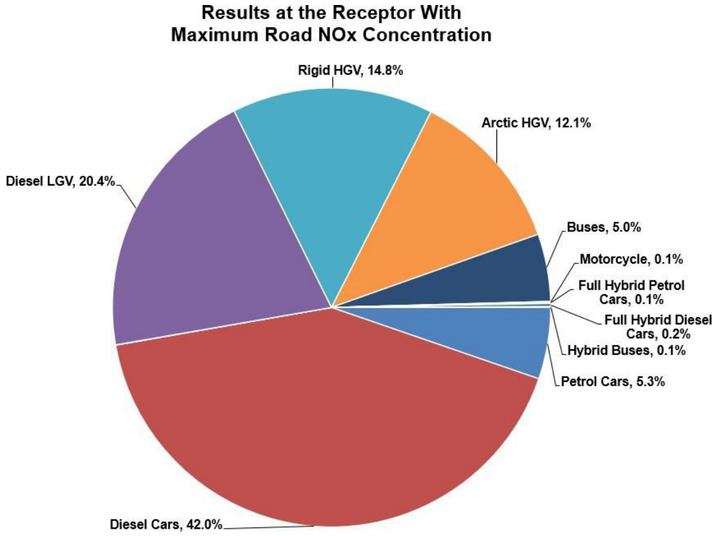
Table 5.14 – Area of Concern (Fairfield Road), Detailed NO_x Source Apportionment

Metric	All	Petrol Car	Diesel Car	Petrol LGV	Diesel LGV	Rigid HGV	Arctic HGV	Bus	Motor-cycle	Full Hybrid Petrol Car	Plug-In Hybrid Petrol Car	Full Hybrid Diesel Car	Hybrid Bus	Background
Average Across All Modelled Receptors														
NOx (µg/m^3)	19.6	1.1	8.5	0.0	4.3	2.6	2.0	1.0	0.0	0.0	0.0	0.0	0.0	13.5
% of Total NO_x	59.2	3.3	25.7	0.0	12.9	7.9	6.1	2.9	0.0	0.1	0.0	0.1	0.1	40.8
% contribution to Road NO_x	100.0	5.6	43.5	0.0	21.8	13.3	10.3	5.0	0.1	0.1	0.0	0.2	0.2	-
At Receptor With Maximum Road NOx Contribution														
NOx (µg/m^3)	123.1	6.5	51.7	0.0	25.1	18.3	14.9	6.1	0.1	0.1	0.0	0.3	0.1	13.5
% of Total NO_x	90.1	4.7	37.8	0.0	18.4	13.4	10.9	4.5	0.0	0.1	0.0	0.2	0.1	9.9
% contribution to Road NOx	100.0	5.3	42.0	0.0	20.4	14.8	12.1	5.0	0.1	0.1	0.0	0.2	0.1	-

Figure 5.6 – Area of Concern (Fairfield Road), Detailed NOx Source Apportionment







5.4 Modelled NO_2 Concentration Plot

The NO_2 concentration plot of Figure 5.7, Figure 5.8 and Figure 5.9 indicates that there are exceedances of the NO_2 annual mean along the main arterial routes which either lead into or pass directly through the AQMAs. There are also exceedances along the Fairfield Road. Along the modelled road network, there are multiple receptors of relevant exposure that exceed the 40 μg/m^3 limit, indicating that the current AQMA designations should remain in place. The Council should also consider declaring an AQMA along Fairfield Road, due to the modelled exceedances.

The maximum and minimum NO_2 concentration that are predicted at the receptors of relevant exposure in the model, for each of the three areas (AQMA 1, AQMA 2 and the area of concern on Fairfield Road) is as follows:

AQMA 1 (Tintwistle):

- Maximum NO_2: 33.7 μg/m^3
- Minimum NO_2: 27.8 μg/m^3

AQMA 2 (Dinting Vale):

- Maximum NO_2: 48.0 μg/m^3
- Minimum NO_2: 29.2 μg/m^3

Area of Concern (Fairfield Road):

- Maximum NO_2: 63.0 μg/m^3
- Minimum NO_2: 27.5 μg/m^3

Figure 5.7 – NO_2 Concentration Plot at Receptors in AQMA 1 (Tintwistle)

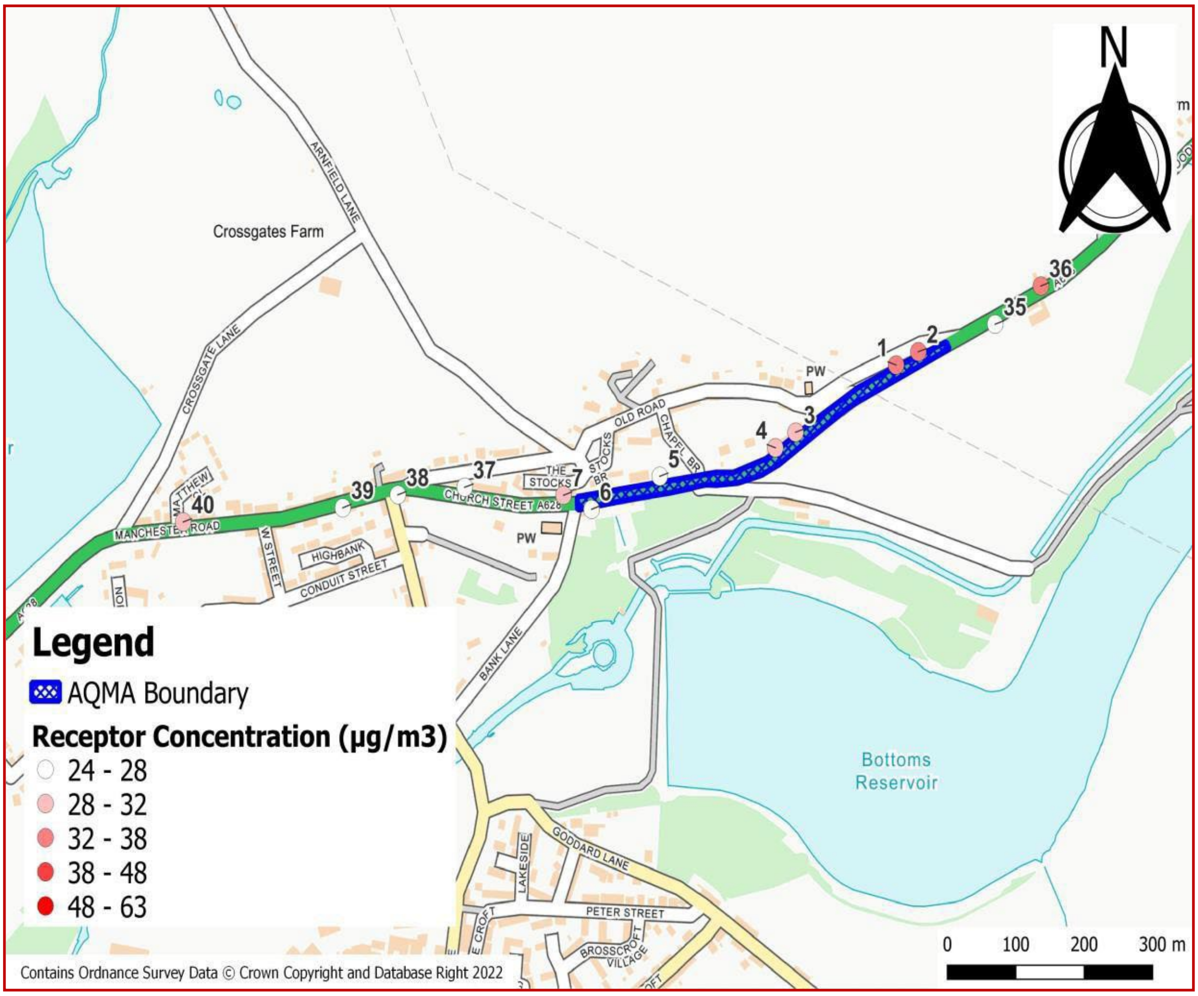


Figure 5.8 – NO_2 Concentration Plot at Receptors in AQMA 2 (Dinting Vale)

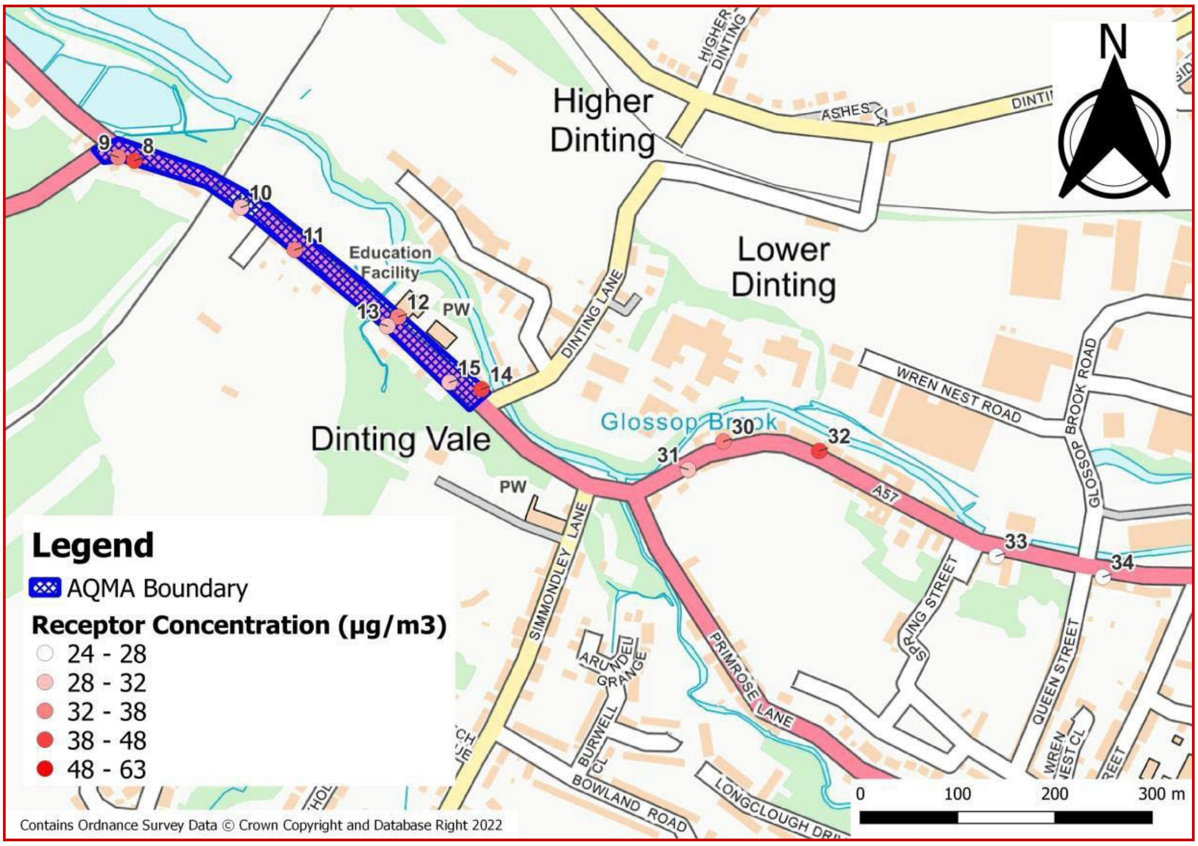
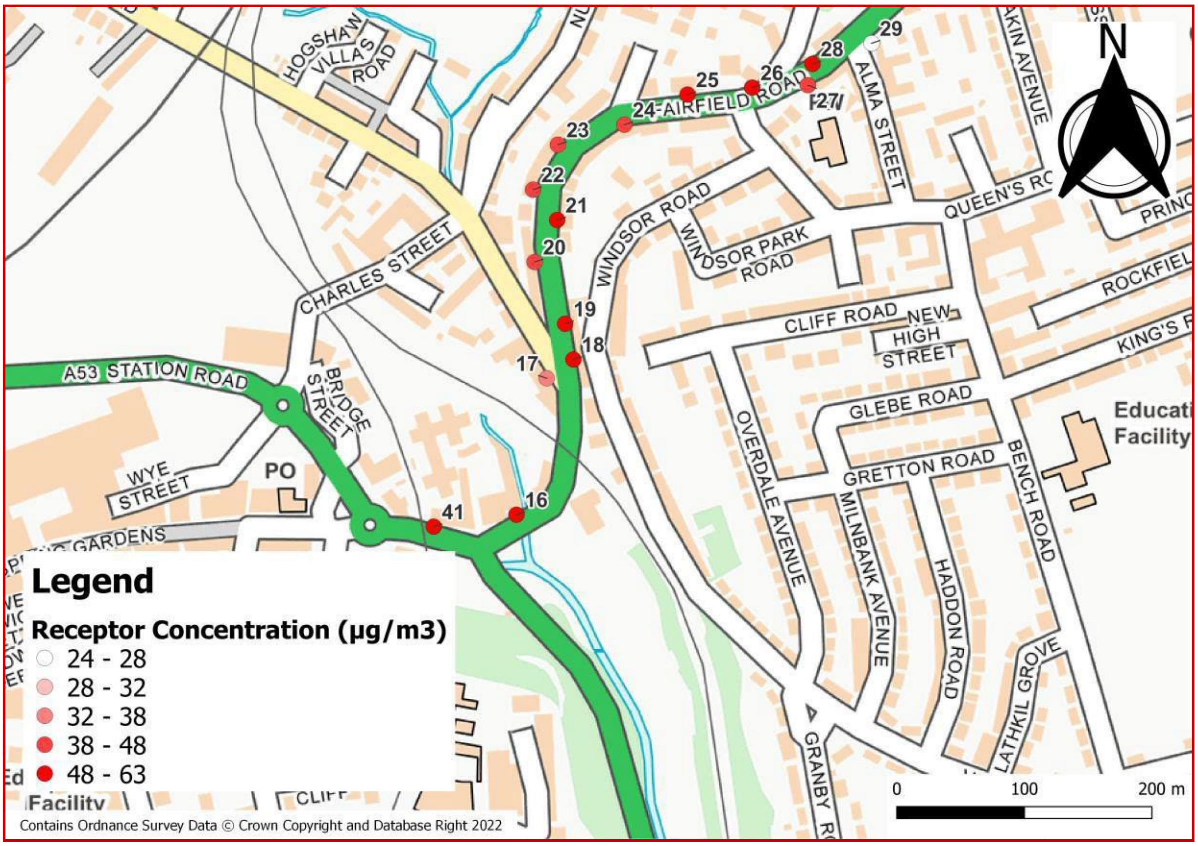


Figure 5.9 – NO_2 Concentration Plot at Receptors in the Area of Concern (Fairfield Road)



6 Conclusions and Recommendations

Following the completion of the analysis of both monitoring data and modelled concentrations across the modelled area, in particular where exceedances were modelled in AQMA 2 (Dinting Vale) and the area of concern (Fairfield Road), the following conclusions and recommendations are made.

6.1 AQMA 1 (Tintwistle)

AQMA 1 (Tintwistle) is currently designated for exceedances of the NO_2 annual mean, with three diffusion tube monitoring locations (HP5, HP6 and HP8) collecting data within the AQMA boundary. From 2019, there has been no exceedances of the NO2 annual mean objective at these locations. This is consistent with the modelling undertaken, where the maximum annual mean concentration at any receptor location in 2019 was 33.7 µg/m^3. The Council should continue to monitor this area and, if concentrations remain consistently below the AQS objective, should consider revoking AQMA 1. However, it is important to be aware of the impacts of the COVID-19 pandemic on concentrations in 2020 and 2021.

6.2 AQMA 2 (Dinting Vale)

AQMA 2 (Dinting Vale) is currently designated for exceedances of the NO_2 annual mean, with two diffusion tube monitoring locations (HP21 and HP25) collecting data within the AQMA boundary. From when monitoring started at these locations, exceedances have been noted for two consecutive years at both sites, prior to 2019.

Detailed modelling has predicted areas of exceedances, that are above the 40 µg/m^3 annual mean limit, such as 48.0 µg/m^3 at Receptor 8. Therefore, the predicted concentrations indicate that the highest concentration occurs at the top of the AQMA, where the junction between Glossop Road and the Dinting Vale (A57) is situated. Exceedances were also predicted at the other end of the AQMA, where the junction between Dinting Lane and Dinting Vale (A57) is situated.

Based upon the analysis of results, it is recommended that the AQMA remains in place with the current boundary and monitoring should continue in this area. The current boundary should remain as it is, based upon the fact that exceedances are modelled at both ends of the current AQMA area.

6.3 Area of Concern (Fairfield Road)

Along the area of concern (Fairfield Road), exceedances are noted in both the modelled results and the passive diffusion tube monitoring data. For example, a concentration of 50.3 µg/m^3 was recorded at diffusion tube site HP42 in 2019, whilst a maximum NO_2 concentration of 63.0 µg/m^3 was predicted from the detailed modelling study. This predicted exceedance of the NO_2 annual mean objective is located at the junction between St. Peter's Rd/Queen's Road and Fairfield Road. The NO_2 annual mean objective is also exceeded at numerous other locations along Fairfield Road, with receptors 18 to 25 all exceeding 40 µg/m^3.

Based upon the analysis of results, it is recommended that the Council continue to monitor this area and declare an AQMA if necessary. The Council already have extensive diffusion tube monitoring in place in this area, which is commended, and should continue to provide evidence for the declaration of an AQMA if necessary. The Council should also expand the diffusion tube monitoring network to the north of Fairfield Road, as exceedances of the NO_2 annual mean objective have been predicted.

6.4 Source Apportionment

Source apportionment analysis for both AQMAs and the area of concern demonstrates that diesel cars, diesel LGS, and to a lesser extent buses, rigid/arctic HGVs, and petrol cars contribute the largest amounts to road NO_x and NO_2. As such, measures contained within the AQAP should focus on reducing emissions from these vehicle classes.

Appendix A – Traffic Data

Table A.1 – Annual Average Daily Traffic (AADT) Data

Source ID	Source Name	Speed (kph)	Traffic Flow (AADT)	% Car	% LGV	% Rigid HGV	% Artic HGV	% Bus and Coach	% Motorcycle
85	Dinting Vale	5	14361	77.6	16.7	3.5	1.3	0.3	0.7
86		20	14361	77.6	16.7	3.5	1.3	0.3	0.7
87		48	14361	77.6	16.7	3.5	1.3	0.3	0.7
88		10	18383	82.0	13.7	2.6	0.7	0.7	0.4
89		5	18383	82.0	13.7	2.6	0.7	0.7	0.4
90		48	18383	82.0	13.7	2.6	0.7	0.7	0.4
91		48	18383	82.0	13.7	2.6	0.7	0.7	0.4
92		10	18383	82.0	13.7	2.6	0.7	0.7	0.4
93		10	19486	82.0	13.7	2.6	0.7	0.7	0.4
94		20	19486	82.0	13.7	2.6	0.7	0.7	0.4
95		10	19486	82.0	13.7	2.6	0.7	0.7	0.4
96	High Street West	10	17704	83.1	14.3	1.2	0.1	0.8	0.5
97		48	17704	83.1	14.3	1.2	0.1	0.8	0.5
98		48	17704	83.1	14.3	1.2	0.1	0.8	0.5
99	A628 Manchester Road	48	11676	68.5	18.6	4.6	7.6	0.4	0.3
100		48	11676	68.5	18.6	4.6	7.6	0.4	0.3
101		10	11676	68.5	18.6	4.6	7.6	0.4	0.3
102		48	11676	68.5	18.6	4.6	7.6	0.4	0.3
103		10	11676	68.5	18.6	4.6	7.6	0.4	0.3
104		64	11676	68.5	18.6	4.6	7.6	0.4	0.3
105	A628 Woodhead Road	64	12324	65.0	21.0	6.4	6.9	0.2	0.6
106		64	12324	65.0	21.0	6.4	6.9	0.2	0.6
107		64	12324	65.0	21.0	6.4	6.9	0.2	0.6
108	A53 St. John's Road	10	12499	81.4	13.0	2.8	1.5	0.5	0.8
109		20	12499	81.4	13.0	2.8	1.5	0.5	0.8
110	A53 Station Road	10	13890	81.1	11.7	3.1	1.8	1.4	1.0
111		32	13890	81.1	11.7	3.1	1.8	1.4	1.0
112		32	13890	81.1	11.7	3.1	1.8	1.4	1.0
113		20	13890	81.1	11.7	3.1	1.8	1.4	1.0
114		10	13890	81.1	11.7	3.1	1.8	1.4	1.0
115	A53 Bridge Street	10	13890	81.1	11.7	3.1	1.8	1.4	1.0
116		20	13890	81.1	11.7	3.1	1.8	1.4	1.0
117		10	13890	81.1	11.7	3.1	1.8	1.4	1.0
118	A53 Spring Gardens	10	13890	81.1	11.7	3.1	1.8	1.4	1.0
119		20	13890	81.1	11.7	3.1	1.8	1.4	1.0
120		10	13890	81.1	11.7	3.1	1.8	1.4	1.0
121	A6 Fairfield Road	10	21707	78.7	13.5	3.4	3.3	0.7	0.4
122		32	21707	78.7	13.5	3.4	3.3	0.7	0.4
123		32	21707	78.7	13.5	3.4	3.3	0.7	0.4
124		32	21707	78.7	13.5	3.4	3.3	0.7	0.4
125		32	21707	78.7	13.5	3.4	3.3	0.7	0.4
126		32	21707	78.7	13.5	3.4	3.3	0.7	0.4
127		32	21707	78.7	13.5	3.4	3.3	0.7	0.4
128		32	21707	78.7	13.5	3.4	3.3	0.7	0.4
129		20	21707	78.7	13.5	3.4	3.3	0.7	0.4
130		48	21707	78.7	13.5	3.4	3.3	0.7	0.4
131		32	21707	78.7	13.5	3.4	3.3	0.7	0.4
132	A6 Bakewell Road	10	13361	82.0	11.7	2.1	3.4	0.3	0.6
133		32	13361	82.0	11.7	2.1	3.4	0.3	0.6
134		48	13361	82.0	11.7	2.1	3.4	0.3	0.6
135	A628 Manchester Road	48	11676	68.5	18.6	4.6	7.6	0.4	0.3
136	A628 Woodhead Road	48	12324	65.0	21.0	6.4	6.9	0.2	0.6

Appendix B – Model Verification

Model Setup

The ADMS-Roads dispersion model has been widely validated for this type of assessment and is specifically listed in the LAQM TG(22) guidance as an accepted dispersion model.

Model validation undertaken by the software developer (CERC) will not have included validation in the specific modelled area. It is therefore necessary to perform a comparison of modelled results with local monitoring data at relevant locations. This process of verification attempts to minimise the modelling uncertainty and systematic error by correcting modelled results by an adjustment factor to gain greater confidence in the final results.

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including uncertainties associated with:

- Background concentration estimates;
- Source activity data such as traffic flows and emissions factors;
- Monitoring data, including locations; and
- Overall model limitations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all these aspects.

Model setup parameters and input data were checked prior to running the models in order to reduce these uncertainties. The following were checked to the extent possible to ensure accuracy:

- Traffic data;
- Distance between sources and monitoring as represented in the model;
- Speed estimated on roads; and
- Background monitoring and background estimates.

NO_2 Verification Calculations

The verification of the model output was performed in accordance with the guidance provided in Chapter 7 of LAQM TG(22). Three separate verifications were completed on the model, relating to the tree areas assessed in the model (AQMA 1, AQMA 2 and the area of concern on Fairfield Road).

Relevant monitoring locations within the Council's jurisdiction (those adjacent to modelled road) have been used in the verification. The diffusion tubes used for each area are as follows:

AQMA 1 (Tintwistle): HP3, HP4, HP5, HP6, HP8, HP20 and HP30.

AQMA 2 (Dinting Vale): HP21, HP22 and HP25.

Area of Concern (Fairfield Road): HP33, HP41, HP42 and HP43.

Table B.1, Table B.2 and Table B.3 shows an initial comparison of the monitored and unverified modelled NO_2 results for the year 2019, in order to determine if verification and adjustment was required. These results are presented in separate tables for the individual areas that were considered and assessed within the detailed model.

Table B.1 – Unverified Modelled and Monitored NO_2 Concentrations (AQMA 1)

Site ID	Background NO_2 (µg/m^3)	Monitored Total NO_2 (µg/m^3)	Unverified Modelled Total NO_2 (µg/m^3)	% Difference (Modelled vs. Monitored)
HP3	9.5	25.7	15.2	-40.9
HP4	9.5	32.6	16.0	-51.0
HP5	9.5	37.4	16.4	-56.2
HP6	9.5	30.0	14.7	-51.0
HP8	9.5	35.5	16.9	-52.5
HP20	9.9	26.3	14.6	-44.8
HP30	9.9	27.3	15.0	-45.1

Table B.2 – Unverified Modelled and Monitored NO_2 Concentrations (AQMA 2)

Site ID	Background NO_2 (µg/m^3)	Monitored Total NO_2 (µg/m^3)	Unverified Modelled Total NO_2 (µg/m^3)	% Difference (Modelled vs. Monitored)
HP21	9.8	38.9	18.0	-53.7
HP22	9.8	31.3	14.9	-52.5
HP25	9.9	46.3	19.1	-58.8

Table B.3 – Unverified Modelled and Monitored NO_2 Concentrations (Area of Concern)

Site ID	Background NO_2 (µg/m^3)	Monitored Total NO_2 (µg/m^3)	Unverified Modelled Total NO_2 (µg/m^3)	% Difference (Modelled vs. Monitored)
HP31	10.3	45.4	17.5	-61.6
HP41	10.3	44.4	19.8	-55.4
HP42	10.3	50.3	21.8	-56.8
HP43	10.3	34.0	18.0	-47.1

The data in Table B.1, Table B.2 and Table B.3 shows that the model was under predicting at all three locations. At this stage, all model inputs were changed to ensure their accuracy; this includes road and monitoring site geometry, traffic data, link emission rates, 2019 monitoring results, background concentrations and modelling features such as street canyons. Following a level of QA/QC completed upon the model, no further improvement of the modelled results could be obtained on this occasion. The difference between modelled and monitored concentrations was greater than - 25% at the majority of locations therefore adjustment of the results was necessary. The relevant data was then gathered to allow the adjustment factor to be calculated.

Table B.4, Table B.5 and Table B.6 provides the relevant data required to calculate the model adjustment based on regression of the modelled and monitored road source contribution to NO_x.

- **Table B.4 – Data Required for Adjustment Factor Calculation (AQMA 1)**

Site ID	Monitored Total NO_2 (µg/m^3)	Monitored Total NO_x (µg/m^3)	Background NO_2 (µg/m^3)	Background NO_x (µg/m^3)	Monitored Road Contribution NO_2 (Total - Background) (µg/m^3)	Monitored Road Contribution NO_x (Total - Background) (µg/m^3)	Modelled Road Contribution NO_x (Excludes Background) (µg/m^3)
HP3	25.7	43.4	9.5	12.4	16.2	31.0	10.4
HP4	32.6	58.0	9.5	12.4	23.1	45.6	11.9
HP5	37.4	68.7	9.5	12.4	27.9	56.3	12.7
HP6	30.0	52.5	9.5	12.4	20.5	40.1	9.5
HP8	35.5	64.4	9.5	12.4	26.0	52.0	13.6
HP20	26.3	44.5	9.9	12.9	16.5	31.6	8.5
HP30	27.3	46.6	9.9	12.9	17.5	33.7	9.4

Table B.5 – Data Required for Adjustment Factor Calculation (AQMA 2)

Site ID	Monitored Total NO_2 ($\mu g/m^3$)	Monitored Total NO_x ($\mu g/m^3$)	Background NO_2 ($\mu g/m^3$)	Background NO_x ($\mu g/m^3$)	Monitored Road Contribution NO_2 (Total - Background) ($\mu g/m^3$)	Monitored Road Contribution NO_x (Total - Background) ($\mu g/m^3$)	Modelled Road Contribution NO_x (Excludes Background) ($\mu g/m^3$)
HP21	38.9	71.9	9.8	12.8	29.1	59.1	15.2
HP22	31.3	54.9	9.8	12.8	21.5	42.2	9.3
HP25	46.3	89.7	9.9	12.9	36.5	76.8	17.2

Table B.6 – Data Required for Adjustment Factor Calculation (Area of Concern)

Site ID	Monitored Total NO_2 ($\mu g/m^3$)	Monitored Total NO_x ($\mu g/m^3$)	Background NO_2 ($\mu g/m^3$)	Background NO_x ($\mu g/m^3$)	Monitored Road Contribution NO_2 (Total - Background) ($\mu g/m^3$)	Monitored Road Contribution NO_x (Total - Background) ($\mu g/m^3$)	Modelled Road Contribution NO_x (Excludes Background) ($\mu g/m^3$)
HP31	45.4	87.2	10.3	13.5	35.2	73.7	13.3
HP41	44.4	84.6	10.3	13.5	34.1	71.1	17.8
HP42	50.3	99.4	10.3	13.5	40.1	85.9	21.6
HP43	34.0	60.7	10.3	13.5	23.8	47.2	14.3

Figure B.1, Figure B.2 and Figure B.3 provide a comparison of the modelled road contribution NO_x versus monitored road contribution NO_x, and the equation of the trend line based on linear regression through zero. The total monitored NO_x contribution has been derived by back-calculating NO_x from the NO_x/NO_2 empirical relationship using the spreadsheet tool available from Defra's website.

The equation of the trend lines presented in Figure B.1, Figure B.2 and Figure B.3 gives an adjustment factor for the modelled results of 3.841 (AQMA 1), 4.254 (AQMA 2) and 4.098 (Area of Concern), respectively.

Figure B.1 – Unverified Modelled Road NO_x Contribution (AQMA 1)

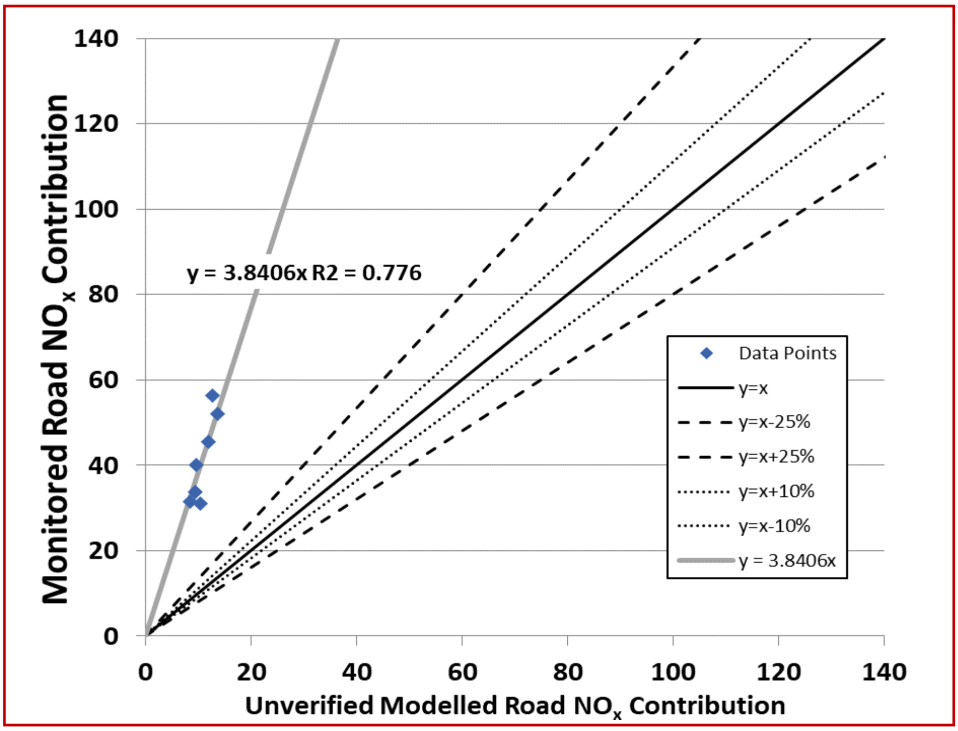


Figure B.2 – Unverified Modelled Road NO_x Contribution (AQMA 2)

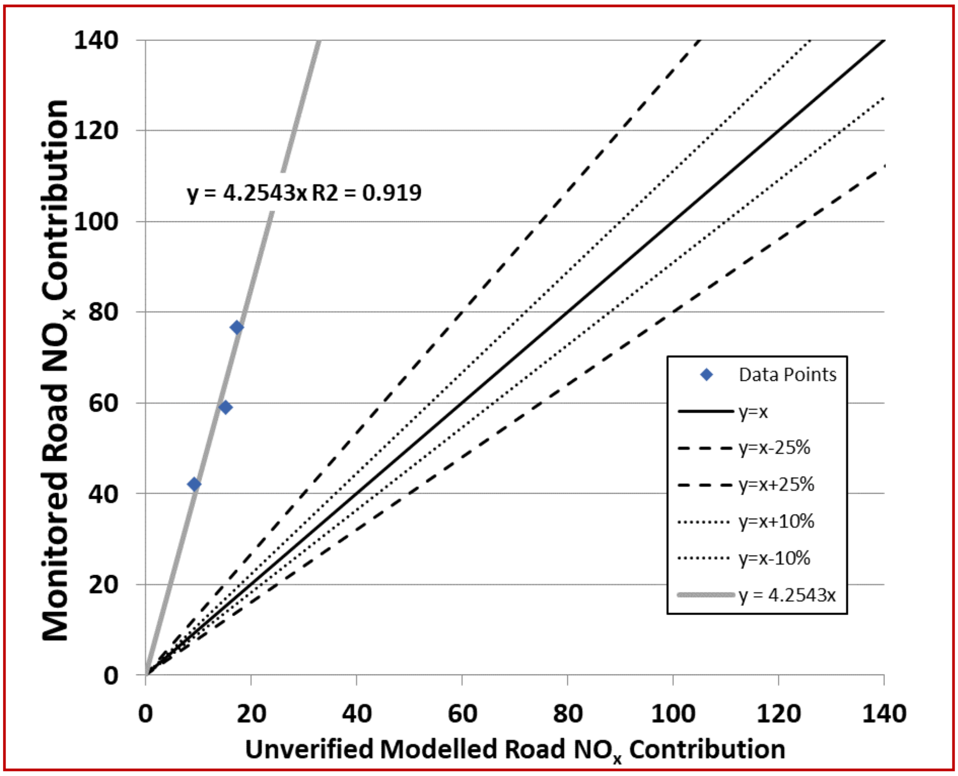
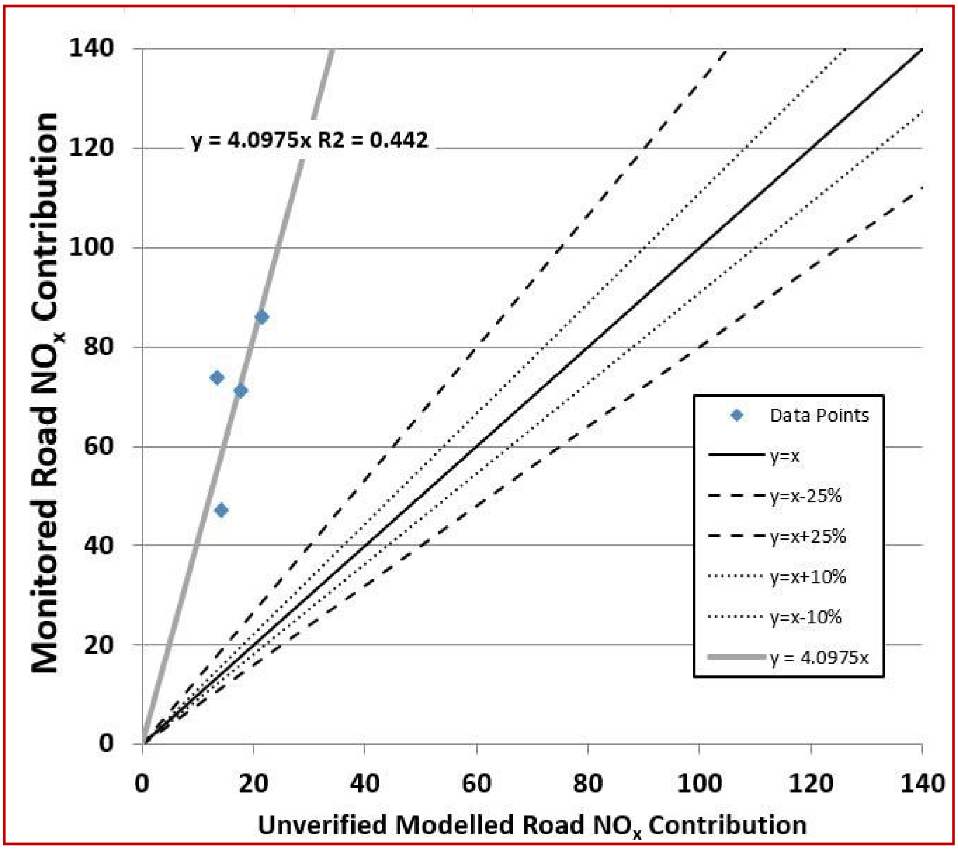


Figure B.3 – Unverified Modelled Road NO_x Contribution (Area of Concern)



Model adjustment needs to be undertaken for NO_x rather than NO_2. For the monitoring results used in the calculation of the model adjustment, NO_x was derived from NO_2, using the NO_x to NO_2 calculator (V8.1) spreadsheet tool available from the LAQM website. The results of the final verification factor for each of the three areas that were included in the model are presented in Table B.7, Table B.8 and Table B.9.

Table B.7 – Final Verification Calculation (AQMA 1)

Site ID	Ratio of Monitored Road Contribution NO_x / Modelled Road Contribution NO_x	Adjustment Factor for Modelled Road Contribution NO_x	Adjusted Modelled Road Contribution NO_x (µg/m^3)	Adjusted Modelled Total NO_x (Including Background NO_x) (µg/m^3)	Modelled Total NO_2 (Based upon Empirical NO_x / NO_2 Relationship) (µg/m^3)	Monitored Total NO_2 (µg/m^3)	% Difference (Adjusted Modelled NO_2 vs. Monitored NO_2)
HP3	2.98	3.841	39.9	52.3	30.0	25.7	16.6
HP4	3.83		45.7	58.1	32.7	32.6	0.2
HP5	4.44		48.7	61.1	34.0	37.4	-9.1
HP6	4.20		36.6	49.0	28.4	30.0	-5.4
HP8	3.83		52.1	64.5	35.6	35.5	0.2
HP20	3.70		32.8	45.7	26.9	26.3	2.3
HP30	3.59		36.1	49.0	28.5	27.3	4.2

Table B.8 – Final Verification Calculation (AQMA 2)

Site ID	Ratio of Monitored Road Contribution NO_x / Modelled Road Contribution NO_x	Adjustment Factor for Modelled Road Contribution NO_x	Adjusted Modelled Road Contribution NO_x (µg/m^3)	Adjusted Modelled Total NO_x (Including Background NO_x) (µg/m^3)	Modelled Total NO_2 (Based upon Empirical NO_x / NO_2 Relationship) (µg/m^3)	Monitored Total NO_2 (µg/m^3)	% Difference (Adjusted Modelled NO_2 vs. Monitored NO_2)
HP21	3.89	4.254	64.6	77.4	41.3	38.9	6.1
HP22	4.53		39.6	52.4	30.1	31.3	-3.8
HP25	4.46		73.2	86.2	44.9	46.3	-3.1

Table B.9 – Final Verification Calculation (Area of Concern)

Site ID	Ratio of Monitored Road Contribution NO_x / Modelled Road Contribution NO_x	Adjustment Factor for Modelled Road Contribution NO_x	Adjusted Modelled Road Contribution NO_x (µg/m^3)	Adjusted Modelled Total NO_x (Including Background NO_x) (µg/m^3)	Modelled Total NO_2 (Based upon Empirical NO_x / NO_2 Relationship) (µg/m^3)	Monitored Total NO_2 (µg/m^3)	% Difference (Adjusted Modelled NO_2 vs. Monitored NO_2)
HP31	5.53	4.098	54.6	68.1	37.4	45.4	-17.8
HP41	3.99		73.0	86.4	45.1	44.4	1.7
HP42	3.97		88.6	102.1	51.4	50.3	2.1
HP43	3.30		58.6	72.1	39.1	34.0	14.9

Figure B.4 – Verified Modelled Road NO_x Contribution (AQMA 1)

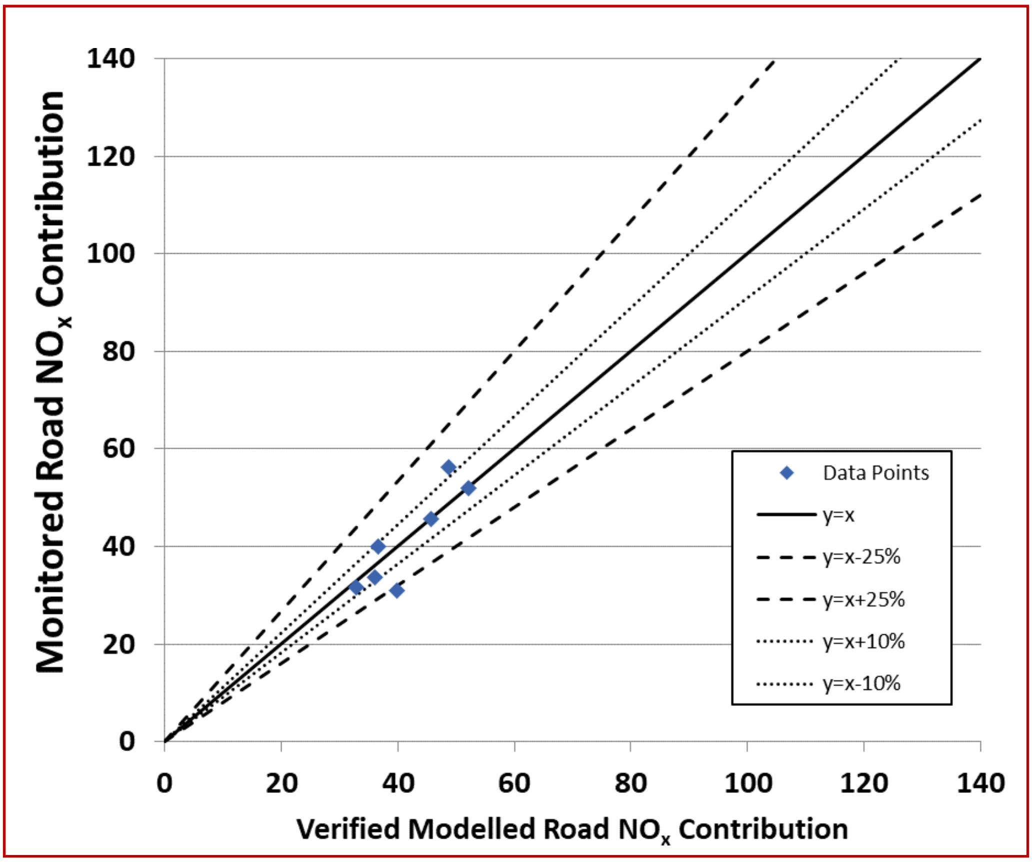


Figure B.5 – Verified Modelled Total NO_2 (AQMA 1)

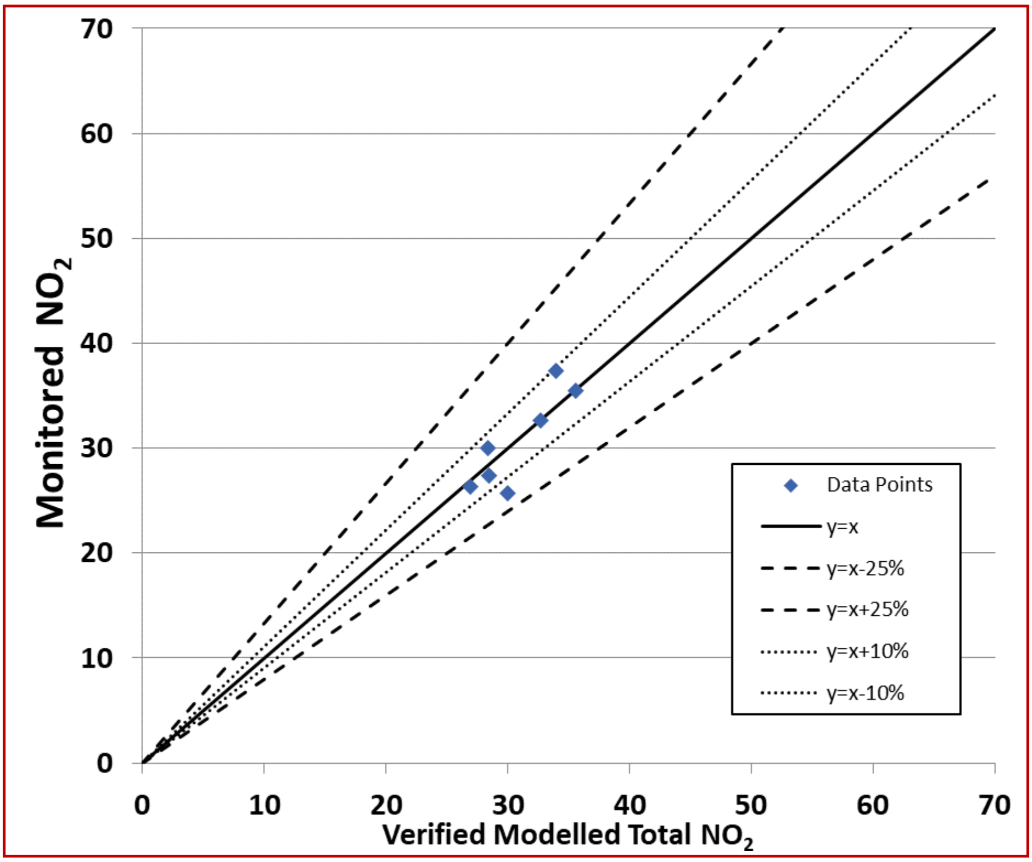


Figure B.6 – Verified Modelled Road NO_x Contribution (AQMA 2)

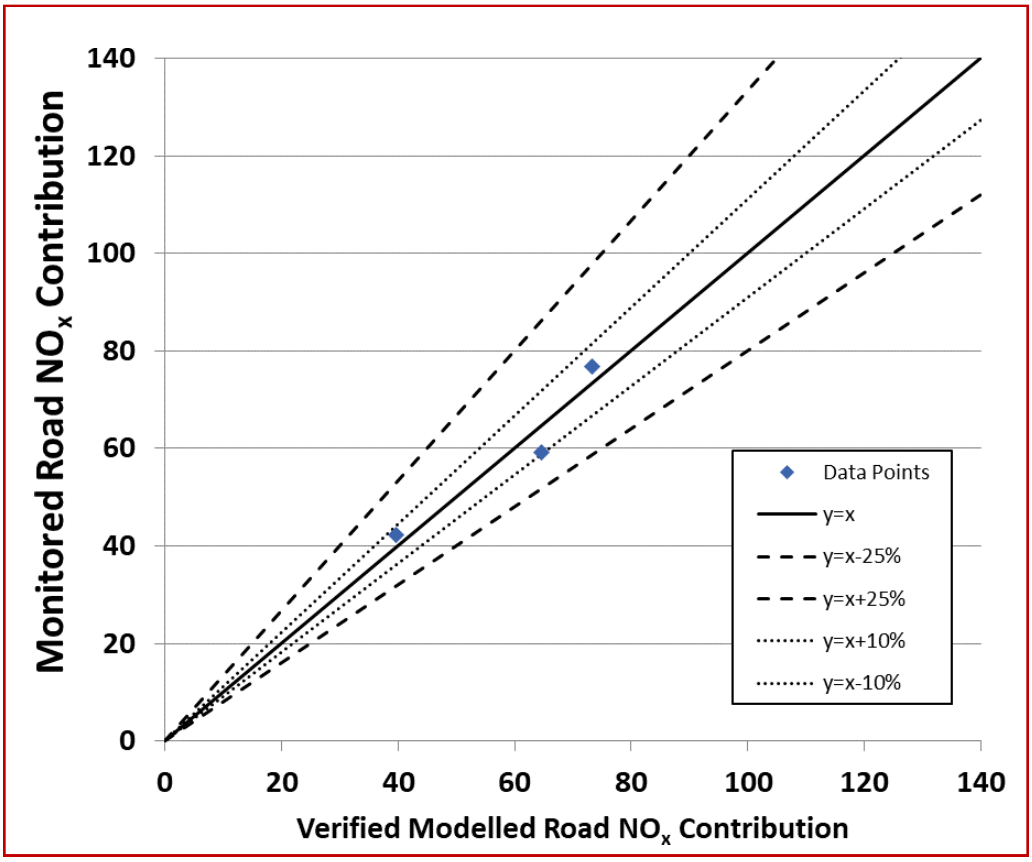


Figure B.7 – Verified Modelled Total NO_2 (AQMA 2)

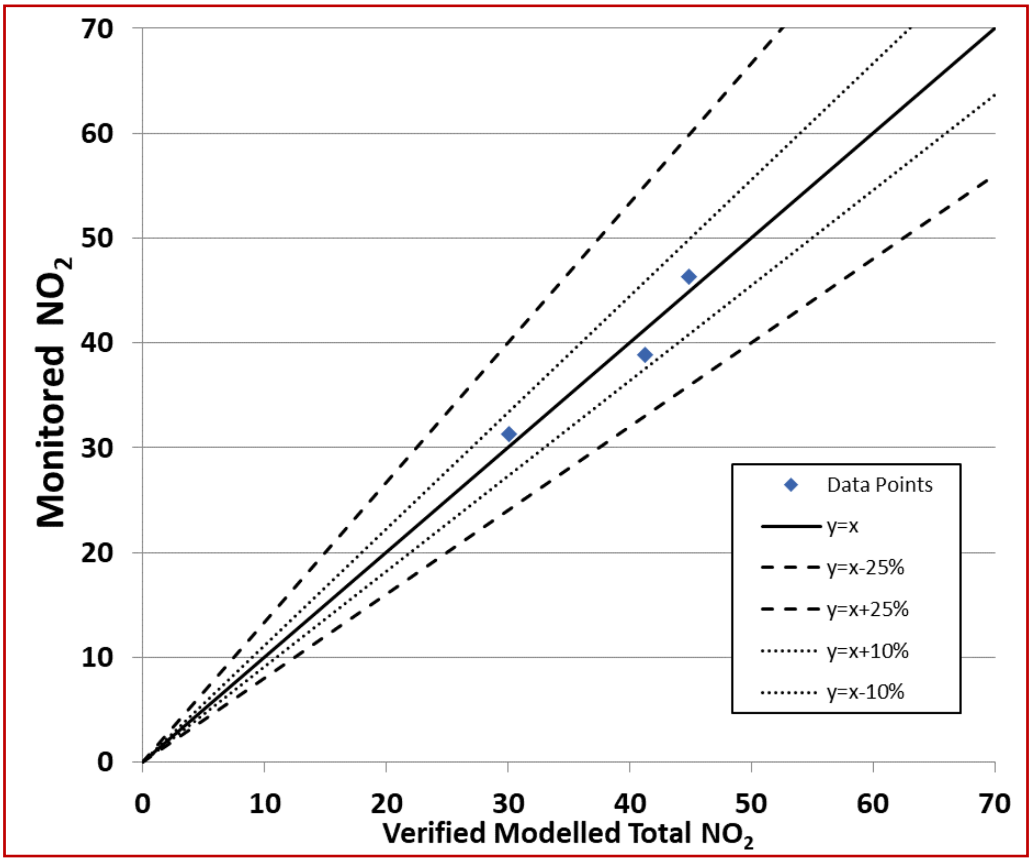


Figure B.8 – Verified Modelled Road NO_x Contribution (Area of Concern)

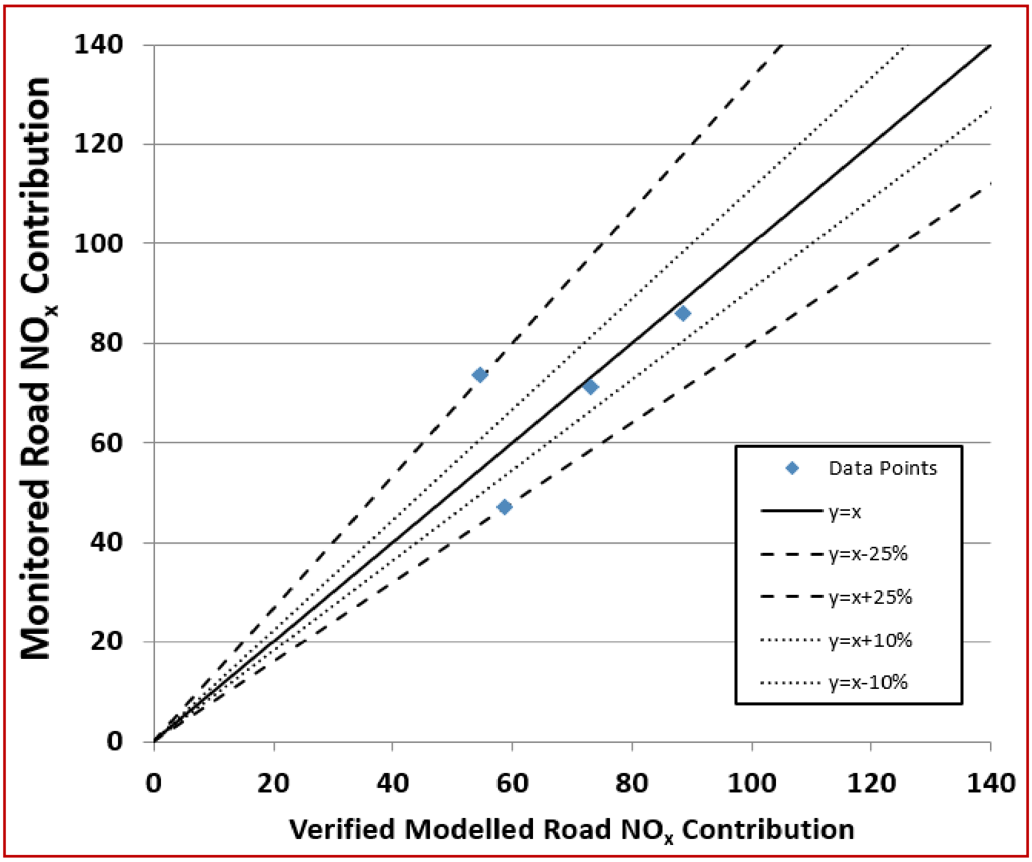
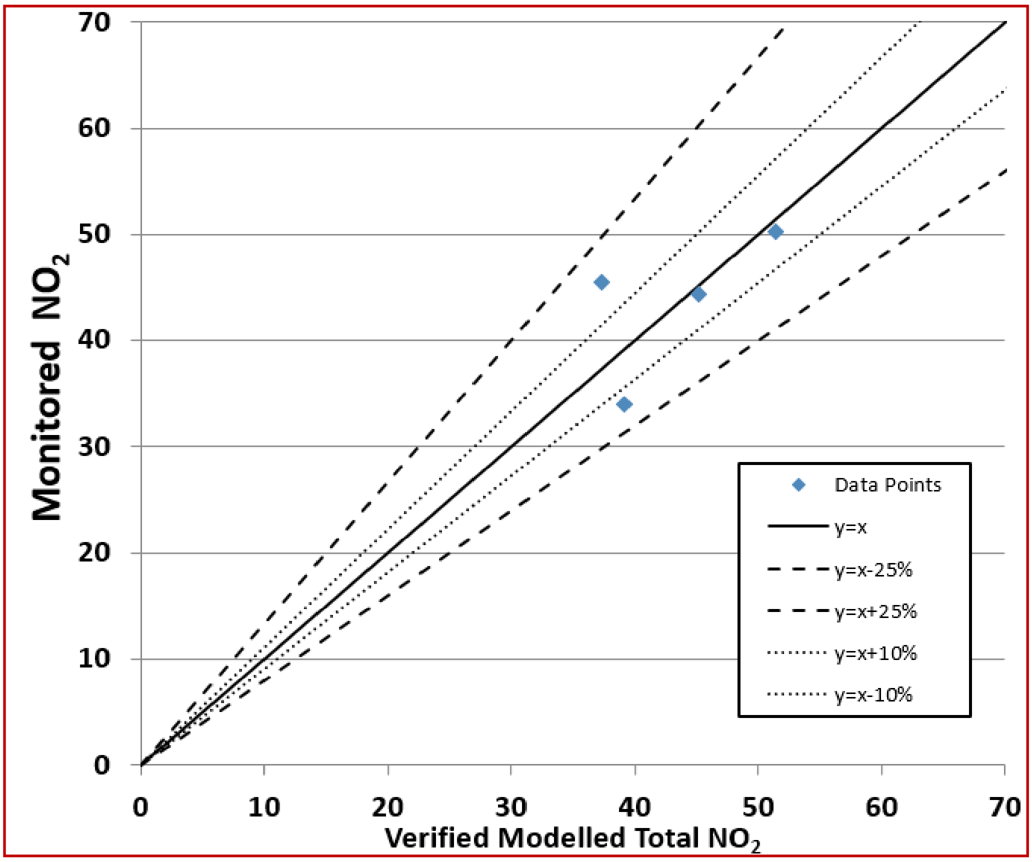


Figure B.9 – Verified Modelled Total NO_2 (Area of Concern)



Appendix C – Modelled Concentrations

Table C.1 – Modelled Concentrations at Receptor Locations

Receptor ID	X	Y	Closest Address	Receptor Type	2019 Annual Mean Concentration (µg/m³)		
					NO_2	PM_{10}	$PM_{2.5}$
1	402685	397440	Woodhead Road	Residential	33.7	14.0	9.2
2	402718	397456			32.6	13.8	9.1
3	402538	397356			29.2	12.9	8.6
4	402509	397336			31.5	13.5	8.9
5	402340	397301			28.8	13.1	8.6
6	402240	397259			27.8	11.6	7.8
7	402199	397277			30.6	12.6	8.4
8	401797	394507	Dinting Vale	Residential	48.0	12.7	8.5
9	401780	394510			39.9	12.2	8.2
10	401906	394458			32.4	12.9	8.5
11	401962	394414			32.4	13.1	8.6
12	402068	394345	Dinting C of E Primary School	Residential	36.7	13.7	9.0
13	402057	394335	Dinting Vale	Residential	29.2	12.4	8.2
14	402153	394269			47.6	13.7	9.1
15	402121	394277			32.0	12.5	8.3
16	406366	373609	Fairfield Road	Residential	50.6	17.3	10.6
17	406390	373717			35.6	15.2	9.3
18	406411	373732			52.7	18.1	11.0
19	406404	373760			52.4	18.0	11.0
20	406380	373809			44.3	16.7	10.2
21	406398	373842			50.0	17.6	10.8
22	406379	373866			45.4	16.8	10.3
23	406399	373901			46.0	17.0	10.3
24	406451	373917			41.7	16.2	9.9
25	406500	373941			50.7	17.7	10.8
26	406551	373947			63.0	18.8	11.6
27	406594	373948			42.2	15.8	9.7
28	406598	373965			59.5	19.3	11.8
29	406644	373982			27.5	14.4	8.7
30	402402	394215	High Street West	Residential	36.3	13.5	8.9
31	402366	394186			31.3	12.5	8.3
32	402501	394205			40.8	14.4	9.4
33	402683	394096			24.2	11.7	7.7
34	402792	394075			24.4	11.7	7.8
35	402830	397491	Woodhead Road	Residential	24.3	12.2	8.1
36	402897	397538			33.3	13.9	9.1
37	402055	397287	Manchester Road	Residential	27.3	12.5	8.3
38	401957	397278			27.5	12.1	8.1
39	401877	397261			28.6	12.6	8.4
40	401644	397244			28.9	12.9	8.5
41	406301	373599	Fairfield Road	Residential	49.8	16.7	10.3

Appendix G: Provisional Additional Measures

Measure No	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Review of Air Quality, Speed limits and Road Safety along A628	Traffic Management	UTC, Congestion management, traffic reduction	2021	Not yet commenced	Highways England (North – East)	Highways England (North – East)	No	Funded			Reduced emissions from vehicles	Reduction in traffic congestion	Not yet commenced	
2	Assessment of impact of the proposed TPUP Scheme along A628 and A57	Traffic Management	UTC, Congestion management, traffic reduction	2017	2022	Highways England (North – West)	Highways England (North – East)	No	Funded			TBC	TBC	Completed in 2021	A final decision on the scheme is due to be announced in December 2022 and will be reported in next years ASR.
3	Junction Capacity and route assessment review along A57	Traffic Management	UTC, Congestion management, traffic reduction	2020	Not yet commenced	Derbyshire County Council (DCC)/ HPBC	DCC/ HPBC	No	Funded			Reduced Vehicle emissions	Reduction in traffic congestion	Glossop Gateway Masterplan and local impact report currently being drafted	Local Impact Report (LIR) delayed due to delay in submission Development Consent Order (DCO) application for the Trans-Pennine Upgrade Programme (the TPUP Scheme).
4	Installation of public rapid EV Charging points across Brough	Promoting Low Emission Transport	Promote Low Emission Vehicles	2018/ 2019	Ongoing	HPBC / DCC/Nottinghamshire County Council (NCC)	HPBC / DCC/NCC	No	Funded			Reduced Vehicle emissions	increased installation of EV charging points	Phase 1 complete	https://www.transportnottingham.com/driving/ultra-low-emission-vehicles/
5	Installation of off-street EV Charging points across borough	Promoting Low Emission Transport	Promote Low Emission Vehicles	2020	Ongoing	HPBC / DCC/NCC	HPBC / DCC/NCC	No	Funded			Reduced Vehicle emissions	increased installation of EV charging points	Phase 2 Complete	https://www.transportnottingham.com/driving/ultra-low-emission-vehicles/

Measure No	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
6	Develop Electric Vehicle Charging Strategy	Promoting Low Emission Transport	Developing infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	Ongoing	HPBC / DCC/	HPBC / DCC/	No	Funded			Reduced Vehicle emissions	Unknown	Near	https://www.transportnottingham.com/driving/electric-vehicle-projects/
7	Incentivise parking for low emission vehicles	Promoting Low Emission Transport	Emission based parking or permit charges	2021	2021 /2022	HPBC/DCC	None	No	Not funded			Reduced emissions from vehicles	TBC	Parking review being undertaken 8for the district	
8	Continue to promote and increase the installation of EV charging points through development control processes	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015	Operational	HPBC	None	No	Not funded			Reduced emissions from vehicles	Increased installation of EV charging points	EV charging points are conditioned through the planning process, this is to be strengthened by the implementation of Air Quality supplementary planning document	
9	Work to improve the cycling network around A57 into Glossop	Promoting low emission transport	Cycle scheme and network	2020	Not yet commenced	HPBC/DCC	TBC HPBC/DCC/ Grant/ HE designated funds	Yes	Funded			Reduced emissions from vehicles	Additional cycling schemes	Glossop Gateway Masterplan and local impact report currently being drafted	Local Impact Report (LIR) delayed due to delay in submission Development Consent Order (DCO) application for the Trans-Pennine Upgrade Programme (the TPUP Scheme).

Measure No	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
10	Construction of a railway station and the return of public trains to Gamesley Station	Alternatives to private vehicle use	Rail based park & ride	2011	Ongoing	Transport for Greater Manchester / DCC/ HPBC	Network Rail	No	Funded			Reduced emissions from vehicles	Rail facilities improved	Construction of a new railway station with publicly accessible trains available	Proposals is currently being considered by parliament
11	Review west bound bus stop by Dinting Vale Primary School	Traffic Management	Other	2021	2021	DCC	DCC / HE designated funds	No	Funded			It is difficult to quantify reduction as a result of this measure but implementing this measure will result in reducing traffic queues and as such reduce emissions	Bus stop reviewed	Not yet commenced Discussions have taken place	A cost of around 10K has been established for this proposal
12	Review of Bus Vehicle Fleet Efficiency	Promoting Low Emission Transport	Promote Low Emission Vehicles	2020	Not yet commenced	HPPC / DCC /Energy Saving Trust /	DCC/ Greater Manchester	No	Funded			Reduced emissions from vehicles	Review of emission limits of buses serving Dinting Vale Primary school	Discussions have taken place with DCC regarding available funding	The introduction of the GM CAZ means funding is available for bus routes serving GM for emissions improvements
13	Investigate the feasibility of implementing a CAZ in Glossop	Traffic Management	Other	2011	Consider at a future date	HPBC/DCC	HPBC/ Defra Grant	Yes	Funded			N/A as this measure will not be pursued at this time	Feasibility of CAZ/LES investigated and implemented if possible	No current suitable route however working with Greater Manchester with their proposed CAZ and as such this may be looked at further	

Measure No	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
14	Increased Focus on AQ in School Travel Plans	Promoting Travel Alternatives	School Travel Plans	2018/ 2019	ongoing	HPBC/ DCC Staffordshire Moorlands District Council (SMDC)/Staffordshire County Council (SCC)	DCC/HPBC	No	Funded			Reduced emissions from vehicles	No of Schools Travel Plans approved & adopted	Travel plans ongoing, additional AQ focus not yet introduced	https://www.derbyshire.gov.uk/transport-roads/transport-plans/sustainable-travel/school-travel-plans/school-travel-plans.aspx
15	School based educational activities	Promoting Travel Alternatives / Public Information	Other	2018/ 2019	Not yet commenced	HPBC/ DCC SMDC/ SCC	DCC/HPBC	No	TBC			Through public awareness	No of schools engaged	Not yet commenced	https://www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Air-aware/Air-aware.aspx
16	Anti-idling initiatives in educational settings	Traffic Management	Anti-idling enforcement	2018/ 2019	Not yet commenced	HPBC/ DCC SMDC/ SCC	DCC/HPBC	No	TBC			Reduced emissions from vehicles	No of schools engaged	Not yet commenced	https://www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Air-aware/Air-aware.aspx
17	Business/ Workplace Travel; Planning	Promoting Travel Alternatives	Workplace Travel Planning	2018/ 2019	Operational	DCC/ HPBC	HPBC/DCC	No	TBC			Reduced emissions from vehicles	No of Business Travel Plans approved & adopted	Quantitative appraisal is on-going	https://www.derbyshire.gov.uk/transport-roads/transport-plans/sustainable-travel/sustainable-travel-and-smarter-choices.aspx
18	Business /Workplace promotion on of Low emission vehicles	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2020	Operational	HPBC/ Energy Saving Trust	HPBC	TBC	TBC			Reduced emissions from vehicles	No of Business engaged with Energy Saving Trust	Quantitative appraisal is on-going	To make business aware of the grants available from to reduce emissions from fleet and impacts of GMCAZ

Measure No	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
19	Communication initiatives, e.g. website information updates	Public Information	Other	2017/18	Operational	HPBC/ SMDC	HPBC	TBC	TBC			Through public awareness	New website	Implementation is on- going	https://www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Air-aware/Air-aware.aspx
20	Encourage taxis licensed by the Council to comply with vehicle emission limits	Promoting Low Emission Transport	Other	Not yet commenced	Not yet commenced	HPBC	HPBC	TBC	TBC			Reduced emissions from vehicles	Number of LEV Taxis in the fleet. All licensed taxis should meet minimum emission standard	This has been on hold whilst we awaited the outcome of National Guidance. Consultation with taxi drivers planned for 2021	
21	Support the procurement of greener fleet	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2019	Not known	HPBC/ Energy Saving Trust	HPBC/ Energy Saving Trust	No	TBC			Reduced emissions from vehicles and buildings	Number of LEV in the fleet	Ongoing	Energy Saving Trust have completed the assessment of our fleet and made recommendations to consider in fleet management and suitable replacements when appropriate
22	Review HPBC Core Strategy PolicyEQ10 Review	Policy Guidance and Development Control	Other policy	2020	EQ10 Operational Review Ongoing	HPBC	HPBC	TBC	TBC			Reduced vehicle and building emissions	New Policy Adopted	Implementation ongoing	
23	Review of HPC strategies / Policies	Policy Guidance and Development Control	Other policy	2020	Review of procurement Strategies has begone	HPBC	HPBC	TBC	TBC			Reduced vehicle and building emissions	New Policy Adopted	Implementation ongoing	
24	Encourage / facilitate home-working	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC/HPBC	TBC	TBC			Reduced vehicle emissions	No of home workers	Ongoing	https://www.derbyshire.gov.uk/transport-roads/transport-plans/sustainable-travel/travel-smart/travel-smart.aspx

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25	Promotion of cycling	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			Reduced vehicle emissions	N/A	Ongoing	https://www.derbyshire.gov.uk/leisure/countryside/access/cycling/cycling.aspx
26	Promotion of walking	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			Reduced vehicle emissions	N/A	Ongoing	https://www.derbyshire.gov.uk/leisure/countryside/access/walking/walking-for-everyone.aspx
27	Car Share Derbyshire	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			Reduced vehicle emissions	No of users	Ongoing	https://liftshare.com/uk/community/derbyshire
28	Promote use of rail – Community rail partnerships	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			Reduced vehicle emissions	N/A	Ongoing	https://www.derbyshire.gov.uk/transport-roads/public-transport/community-rail-partnerships/community-rail-partnerships.aspx
29	Public cycle hire schemes	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC	TBC	TBC			A Reduced vehicle emissions	No of users	Ongoing	https://www.derbyshire.gov.uk/leisure/countryside/access/cycling/cycle-hire/cycle-hire.aspx
30	Improving Cycle network - general	Promoting Travel Alternatives	Workplace Travel Planning	2015	Ongoing	DCC/HPBC	DCC/ Highways Agency	TBC	TBC			Reduced vehicle emissions	Implementation of cycle network improvements	Ongoing	https://www.derbyshire.gov.uk/leisure/countryside/access/cycling/cycling.aspx
31	East Midlands Air Quality Network Guidance for Developers	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018	N/A	PHE /East Midlands Councils	HPBC/ PHE /East Midlands Councils	TBC	TBC			Reduction in a range of pollutants	N/A	Establishes a range of measures expected by developers Reduction in a range of pollutants from development	To be adapted locally taken to the Planning and Health Group on completion for discussion and local adoption and implementation

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32	Derbyshire Air Quality Working Group	Policy Guidance and Development Control	Derbyshire Groups Co-coordinating Area wide Strategies to reduce emissions and improve air quality	2016 onwards	Ongoing	Derby City Council/ DCC/ District Councils	HPBC Derby City Council/ DCC/ District Councils	TBC	TBC			Reduction in a range of pollutants	n/a	Work Plans / Action Plans Developed	Annual report from group taken to Health and Wellbeing Board. Annual work plan created and a ten year Derbyshire Air Quality Strategy in production
33	Raise awareness of impacts of coal and wood burning	Public Information	Regional Groups Co-ordinating programmes to develop Area-wide Strategies to reduce emissions and improve air quality	2010 onwards	Ongoing	HPBC/ Derby City Council/ DCC/ District Councils	HPBC	TBC	TBC			Reduction in a range of pollutants	N/A	Ongoing	DEFRA Leaflet now on Council websites (City and County). In addition, DCC Healthy Homes Programme continues to offer grant funding to convert coal fires to gas central heating systems.
34	Inspect under the Environmental Permit regime and enforce legislation to reduce combustion processes	Environmental Permits	Introduction/ increase of environment charges through permit systems and economic instruments	Ongoing	Continual	HPBC	HPBC/ Fees charged to Business	TBC	TBC			By restricting emissions from industrial processes	Installations adhering to permits and enforcement/penalties for breaches	Ongoing	This is standard HPBC work in Environmental Protection
35	Air quality monitoring	Public Information	Other	Ongoing	Ongoing	HPBC	HPBC	TBC	TBC			N/A	Number of monitoring locations and On-time submittal of ASRs	Ongoing annually	Possibly liaise with Defra regarding need for additional monitoring and/or AURN funding. Consider continuous monitoring and AQ grant application

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36	Derbyshire County Councils Bus Service Improvement Plan	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2021	2029	HPBC/DCC	HPBC/DCC	TBC	TBC			Reduced emissions from vehicles	Percentage of buses at Euro 6 or higher	Ongoing	Derbyshire County Councils Bus Service Improvement Plan has a target for increasing the percentage of buses at Euro 6 or higher to 95% by 2029/30 amongst https://derbysbus.info/Derbyshire%20BSIP%20–%20Final%2029-10-21.pdf
37	New local transport plan	Policy Guidance and Development Control	Other policy	2021	2022	DCC	DCC	TBC	TBC			Reduced emissions from vehicles	N/A	Ongoing	To Facilitate Travel Behaviour Change, The Transport Strategy Team at DCC are developing a new local transport plan, which will impact on air quality, with a consultation in Spring/ Summer of 2022 and publishing the final plan at the end of the year.
38	Greater Manchester Clean Air Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2021	2026	GM	GM	TBC	TBC			Reduced NO2 emission	Compliance with legal NO_2 limits	Ongoing	During 2021, work started on implementing the scheme, which was due to go live in May 2022 and Clean Air Zone signs were placed along all the main routes (A57, A628 and A6) into Greater Manchester from HPBC.

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39	Electric vehicles trial and HVO (hydrotreated veg oil) trail	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2021	2021	SMDC/HPBC	SMDC/HPBC	No	TBC			Reduced emissions from vehicles	N/A	Completed	During 2021 Environmental Services (Waste Collection) trialled a number of electric vehicles, unfortunately all were unsuccessful in having sufficient battery power to complete normal days duties. A 3 month trial of the use of HVO (hydrotreated veg. oil) has been completed with positive results.
40	Cycle to work	Promoting Travel Alternatives	Promotion of cycling	2021	Ongoing	DCC/HPBC	DCC/HPBC	TBC	TBC			Reduced emissions from vehicles	No. of people attending the scheme	Ongoing	Cycle to work scheme relaunched, information available at: https://staff.derbyshire.gov.uk/pay-and-benefits/my-benefits-and-discounts/cycle-to-work-scheme/cycle-to-work-scheme.aspx

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41	Climate Change Action Plan Launched	Policy Guidance and Development Control	Other policy	2021	2021	HPBC	HPBC	No	TBC			Reduced emissions from HPBC buildings, vehicles, operations and others	N/A	Completed	Climate Change Action Plan Launched, with a list of complimentary actions to tackle Air Quality issues https://www.highpeak.gov.uk/ClimateChange https://www.highpeak.gov.uk/media/6680/High-Peak-Climate-Change-Action-Plan/pdf/HP_Climate_change_plan.pdf?m=1626100708743 https://www.highpeak.gov.uk/media/7096/Climate-Change-Action-Plan-Part-2/pdf/HPBC_Draft_Climate_Change_Plan.pdf?m=1650632869773
42	Sustainable Travel Plan - Buxton on Move	Promoting Travel Alternatives	Personalised Travel Planning	2021	Ongoing	HPBC/Buxton Town Team	HPBC/Buxton Town Team	TBC	TBC			Reduced emissions from vehicles	N/A	Ongoing	HPBC will continue and improve engagement with local groups concern with travel around Buxton. Information available at: https://www.buxtontownteam.org/buxton-on-the-move https://www.buxtontownteam.org/_files/ugd/ec6295_375bd67f797247debf478f6094e50f80.pdf

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values’
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
HPBC	High Peak Borough Council

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- Defra. Air quality appraisal: damage cost guidance, January 2023
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- Defra. Environmental Improvement Plan 2023, January 2023
- DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018
- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- National Diffusion Tube Bias Adjustment Factor Spreadsheet, published June 2023.
- Diffusion Tube Data Processing Tool version 3.0, published February 2023