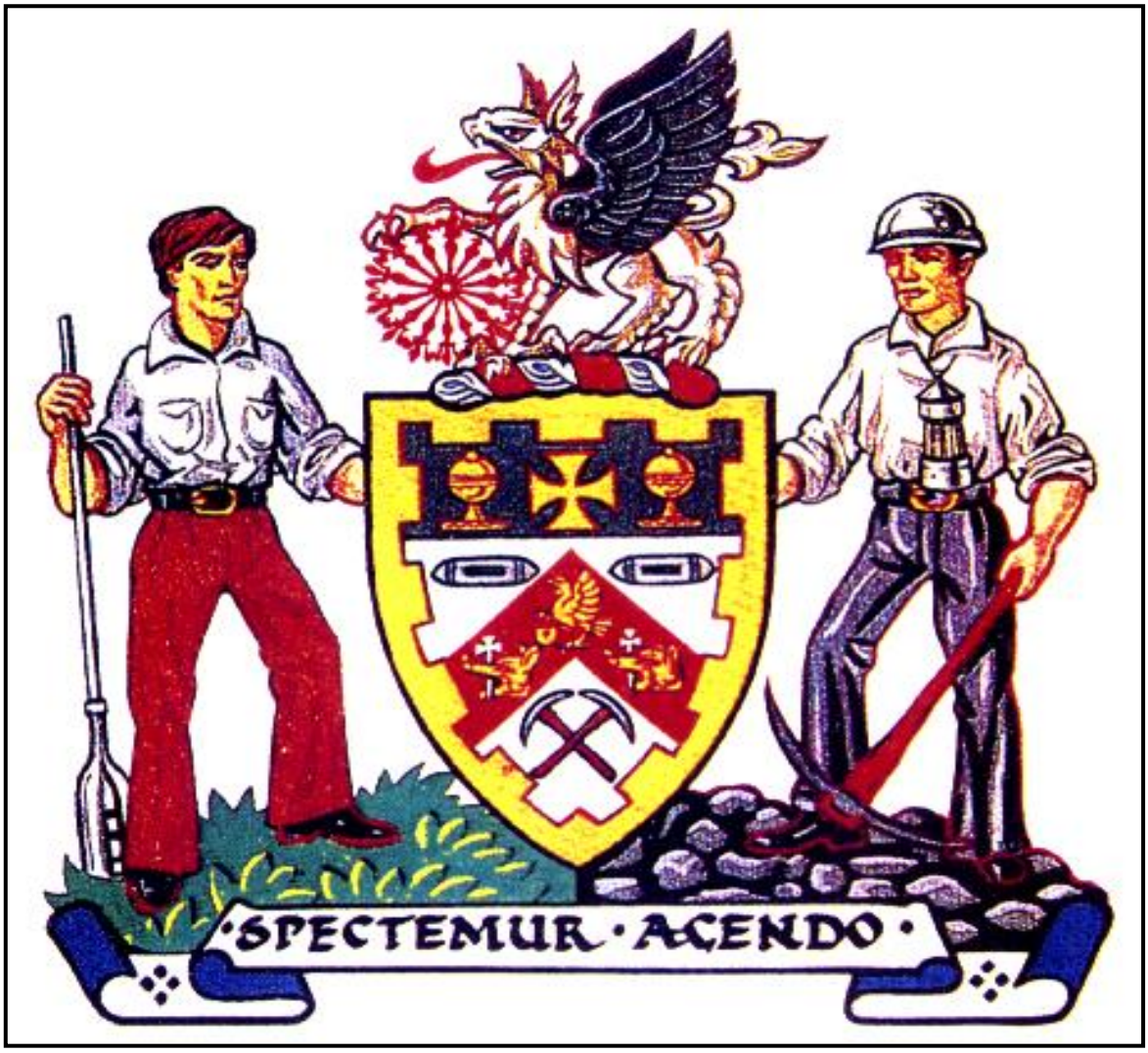

2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: June 2021

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Report Reference Number	
Date	June, 2021

Executive Summary: Air Quality in Our Area

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 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Air pollution concentrations in Barnsley in 2020 and our work to improve our air quality has been affected by the pandemic and subsequent lockdowns and this report attempts to reflect this situation.

The Barnsley Metropolitan Borough Council area covers 32,853 hectares (127 square miles) and has an estimated population of approximately 239 300.

The Borough's air quality issues are typical of an urban location, with emissions from road transport being a major source of air pollution, and the underlying reason for declaration of all our air quality management areas (AQMAs). Emissions from industrial and domestic sources are still of importance however, and continue to be subject to the relevant regulation, where appropriate.

Previous assessment of the borough's air quality revealed the breaching (exceedance) of the annual average objective (standard) for nitrogen dioxide gas (NO_2) at receptors (mainly houses). These areas are close to several arterial roads and junctions near to Barnsley town centre, and close to the M1 motorway. Nitrogen dioxide is strongly

[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, July 2020

[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

associated with traffic emissions in particular. This polluting gas is associated with respiratory symptoms[5].

All Barnsley's current AQMAs are summarised in the table below:

Table ES1: Barnsley's Air Quality Management Areas

AQMA No.	Adjacent roads / junctions	Year declared	Estimated no. of domestic dwellings within AQMA
1	M1 Motorway, 100 metres either side of the central reservation within the Barnsley Borough	2001	265
2A	A628 Dodworth Road	2005	285
4	A61 Harborough Hill Road	2008	42
5	Junction of A633 Rotherham Road and Burton Road	2008	16
6	A616 passing through Langsett	2012	7
7	Junction of A61 Sheffield and A6133 Cemetery Road	2012	2

Further details of our AQMAs can be found at http://uk-air.defra.gov.uk/aqma/list.

The Council has an action plan, completed in May 2017 https://www.barnsley.gov.uk/services/pollution/air-pollution/air-quality/, containing measures designed to improve air quality within our AQMAs and within the Borough as a whole, as it is important to continually drive down emissions and reduce air pollution, even below legal standards to protect public health.

[5] Defra, February 2015 – Getting to grips with air pollution – the latest evidence and techniques – A briefing for Directors of Public Health

This annual status report is being written during a period of change within air quality management. The Government released the Clean Air Strategy in 2019, which proposed new ways to tackle air pollution, particularly domestic emissions, and we await further direction from the forthcoming Environment Act on how air pollution can be further reduced. Furthermore, Clean Air Zones are still being considered for neighbouring cities (Leeds, Greater Manchester, Sheffield-Rotherham), and we will monitor these developments for any potential impact on Barnsley.

In 2020 there was a significant and unprecedented decline in NO_2 concentrations compared with previous years in the Borough. As traffic emissions are the major source of NO_2 within urban areas, the reduction of traffic during the various pandemic lockdowns resulted in reduced concentrations of NO_2, meaning that, for the first time there have been no exceedances of legal air quality standards in the Borough. These reductions in Barnsley are consistent with similar reductions occurring nationally.

We will continue to monitor concentrations in future years, and further monitoring is required in order to continue assessing longer term trends, particularly as traffic flows are now returning back to pre-pandemic levels. Concentrations of other air pollutants such as fine inhalable particles (PM_{10} particles) were not impacted significantly by the pandemic lockdowns.

Further details of Barnsley's local air quality, including up-to-date local data and comparison of these data with the Daily Air Quality Index (which tells us the daily pollution concentrations and their impacts on our health), can be found at our Council air quality webpage at https://www.barnsley.gov.uk/services/pollution/air-pollution/air-quality/. The Council believes it is important that Barnsley residents are made aware of their quality of the air they breathe and how it may impact on them.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy[6] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[7] sets out 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.

During 2020, the Council has had commit significant financial and staff resources to deal with the local impact of the pandemic. This has had impact (either directly or indirectly) on the Councils' ability to deliver front line services to the same level as delivery pre-pandemic. This includes the Councils' local air quality management duties. Nevertheless, the Council has been able to continue with the implementation of actions within the Air Quality Action Plan and continue air quality monitoring, including impact of the pandemic on the Borough's air quality.

The Councils' Air Quality Action Plan Steering Group, consisting of council officers from those services best placed to deliver local air quality improvement, continues to meet to progress actions to improve air quality. The group is chaired by Barnsley's Director of Public Health and the group oversees progress within the Councils' Air Quality Action Plan. The Plan contains seventeen actions designed to improve the quality of the air we breathe, and we report annually to Government on progress on improving local air quality. The actions in the Plan are based around five key themes, with an aim assigned to each them:

Key theme	**Aim**
Reduce Traffic	We aim to improve air quality by promoting public transport and other travel alternatives to the use of the private car
Behavioural Change	We aim to improve air quality by encouraging people who live, work or learn in Barnsley to take steps to reduce their impact

6 Defra. Clean Air Strategy, 2019

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

Increase Efficiency	We aim to improve air quality by ensuring our transport networks operate as efficiently as possible by smoothing traffic flows and reducing congestion
Improve Fleet	We aim to improve air quality by reducing emissions from our Barnsley MBC fleet and other assets
Regulation	We aim to improve air quality by ensuring that industrial and domestic air pollution is correctly and fairly regulated, and ensuring that businesses are aware of their statutory requirements

In 2019, the Council, along with our partners Doncaster MBC, was awarded Defra air quality grant to undertake an eco-driver training project, encouraging local drivers who use their vehicles for business purposes to adopt eco-driving techniques in a bid to lower emissions (https://www.eco-businessdriving.co.uk/) . Prior to the pandemic, this project was progressing well, but had to be halted as the training involved face-to-face tuition. Following discussions with Defra, we are now proceeding with the project by use of an online training module.

In November 2019, the Council formally adopted a Sustainable Travel Supplementary Planning Document to in order to further facilitate green travel options for new development in the Borough, including the requirement for electric vehicle charge points. This should increase the availability of charge points in the Borough, both at new houses development for future residents, but also at future commercial and retail development.

With South Yorkshire partners Doncaster MBC, the Council was successfully in applying in 2020 for Defra air quality grant funding for a “School Streets” project, designed to highlight the benefits of active travel for the daily “school-run”. This project will take place this year and we will report on progress in next years’ Annual Status Report.

In 2020, the Sheffield City Region was awarded £166 million from the Government’s “Transforming Cities Fund” to encourage an increase in journeys made by low carbon, sustainable modes and tackle air pollution. In forthcoming years up to 2022, the Council will be able to bid into this fund for ambitious schemes in the Borough in order to assist in the changes to more sustainable forms of transport, with schemes to be completed by March 2023.

In 2020 the Council approved is first Sustainable Energy Action Plan (SEAP), following the Councils’ declaration of a Climate Emergency in 2019, in order for the Council to become

net zero carbon emissions by 2040 (if nor earlier if possible) and the Borough net zero by 2045. Projects undertaken following the SEAP over the next five years will also benefit local air quality as well as carbon reduction, as the Council seeks to reduce emissions because of more sustainable transport, energy efficiency, and promotion of renewable energy. Further information can be found at https://www.barnsley.gov.uk/services/our-council/helping-our-environment/reducing-carbon-emissions/.

We are in the process of revoking (removing) AQMA 5 at the junction of Burton Road and Rotherham Road, Monk Bretton.

We will continue to work with partner organisations, such as neighbouring local authorities, the City Region, the Environment Agency and Highways England in order continue our work to improve the quality of the air we breathe.

Finally, we understand that the forthcoming Environment Bill is currently undergoing the Committee Stage at Parliament. We will ensure that the Council will take account of any air quality requirements of the Bill going forward.

Conclusions and Priorities

2020 was the first year in Barnsley when legal air quality standards were met within our Borough. However, we expect that traffic emissions will rise again as flows return to pre-pandemic levels. This will have a subsequent impact on air pollution concentrations, particularly NO_2, so therefore we cannot yet predict that air pollution concentrations will continue to meet legal standards in future years. Further information is still required before we can consider revoking additional AQMAs. For air pollutants such as fine particles, health impacts occur below legal standards (there is no safe limit), so progressive improvement in air quality will continue to health benefit in the Borough.

We have further work to do, which includes improving air quality within our AQMAs in order to achieve long-term compliance (particularly in those AQMAs where road traffic emissions are increased due to gradient), whilst continuing to improve air quality as a whole in the Borough.

Going forward, our priorities are the following:

1. Where appropriate we will bid for funding for actions within our Air Quality Action Plan, as and when this funding become available.

2. To continue to work with developers to minimise the air quality impact of new development, and to ensure that this development takes account of future sustainable transport modes.
3. Continue monitoring both inside and outside of AQMAs to gauge progress with actions and ensure continued compliance outside of our AQMAs.
4. To work with Public Health colleagues in order to raise awareness of poor air quality and action that can be taken to reduce emissions and develop programmes such as anti-idling and promotion of Clean Air Day.
5. To work with nearby local authorities who may be required to implement Clean Air Zones, to understand the impact of these zones may have on Barnsley.
6. To re-draft the Action Plan, in light of completion of the previous Action Plan 2016 to 2021

Local Engagement and How to get Involved

Further information on local air quality can be obtained from the Councils' air quality web page https://www.barnsley.gov.uk/services/pollution/air-pollution/air-quality/.

The Council also has an active travel hub, https://barnsley.activetravelhub.co.uk/ , which promotes cycling and walking activity in the Borough.

Local stakeholders are invited to contact the Council regarding local air quality issues. Contact details are given below. Therefore, if you would like more information on our current and past air quality and what we are doing to improve the quality of the air we breathe, please contact us.

Send an e-mail to pollutioncontrol@barnsley.gov.uk

Call us on 01226 773743
Monday to Thursday 8:30am to 5pm Friday 8:30am to 4:30pm
Please note, there is no answering service outside normal office hours.
Or write to:

Barnsley MBC
Regulatory Services
Pollution Control
PO Box 634

BARNSLEY

S70 9GG

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1 Local Air Quality Management

This report provides an overview of air quality in Barnsley during 2020. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Barnsley Council 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 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

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

- NO_2 annual mean;
- NO_2 1-hour mean (AQMA 6 only)

We currently in the process of revoking AQMA 5 (see Section 3: Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance).

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	Name and Date of AQAP Publication	Web Link to AQAP
No. 1	3rd October 2001	NO2 Annual Mean	An area encompassing residential properties one hundred metres either side of the central reservation of the M1 motorway in Barnsley	YES	46.4 µg/m^3	20.1 µg/m^3	Barnsley MBC Air Quality Action Plan	https://www.barnsley.gov.uk/media/18071/air-quality-action-plan.pdf
No. 2A	16th June 2005	NO2 Annual Mean	Residential properties along Dodworth Road between Junction 37 of the M1 motorway and Town End Roundabout, including a portion of Summer Lane	NO	49.7 µg/m^3	26.5 µg/m^3	Barnsley MBC Air Quality Action Plan	https://www.barnsley.gov.uk/media/18071/air-quality-action-plan.pdf
No. 4	7th July 2008	NO2 Annual Mean	Residential properties along the uphill carriageway of Harborough Hill	NO	58.6 µg/m^3	32.8 µg/m^3	Barnsley MBC Air Quality Action Plan	https://www.barnsley.gov.uk/media/18071/air-quality-action-plan.pdf

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	Name and Date of AQAP Publication	Web Link to AQAP
			Road from the gyratory					
No. 5	4th July 2008	NO2 Annual Mean	Residential properties along the uphill carriageway of Burton Road adjacent to the junction with the A633 Rotherham Road	NO	41.1 µg/m^3	24.2 µg/m^3	Barnsley MBC Air Quality Action Plan	https://www.barnsley.gov.uk/media/18071/air-quality-action-plan.pdf
No. 6	30th August 2012, amended 27th October 2016 to include NO2 1-hour mean	NO2 Annual Mean	Residential properties along the A616 Manchester Road in Langsett	YES	77.1 µg/m^3	32.3 µg/m^3	Barnsley MBC Air Quality Action Plan	https://www.barnsley.gov.uk/media/18071/air-quality-action-plan.pdf
No. 7	30th August 2012	NO2 Annual Mean	Residential properties at the junction of Sheffield Road and the A6133 Cemetery Road	NO	48.5 µg/m^3	29.5 µg/m^3	Barnsley MBC Air Quality Action Plan	https://www.barnsley.gov.uk/media/18071/air-quality-action-plan.pdf

☒ **Barnsley Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **Barnsley Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in Barnsley Council

Defra's appraisal of last year's ASR concluded that *"Overall the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work."* With regard to this years' Annual Status Report, the appraisal recommended:

"The Council have presented NO_2 trends however have provided a limited discussion on these trends. It would be beneficial for the Council to discuss NO_2 trends within the City and provide an insight to what may have caused these trends." This is addressed in the Air Quality Monitoring section.

Barnsley Council has taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. seventeen measures are included within Table 2.2, with the type of measure and the progress Barnsley Council have made during the reporting year of 2020 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 our air quality action plan (https://www.barnsley.gov.uk/media/5738/barnsley-mbc-air-quality-action-plan-2017.pdf), which includes important links to other local and regional strategies which have contributed to the Plan. Key completed measures for this ASR are:

- ECO Stars - we intend however to keep this within the Action Plan, should funding to continue become available in future years
- ECO Stars taxis
- Barnsley Intelligent Transport System
- Promoting Travel Alternatives
- Anti-Idling Policy Feasibility Study

Barnsley Council expects the following measure to be completed over the course of the next reporting year:

- Eco-driver training project – a Defra Air Quality Grant funded project working with local grey fleet drivers (drivers who use their personal car for business use) in order to reduce emissions using Eco-driver training techniques. A final report will be submitted to Defra by December 2021.

We continue to be aware of proposals for Clean Air Zones (CAZs) within nearby local authorities in South and West Yorkshire. Whilst CAZs are not proposed for Barnsley, we will continue to work with these authorities in order to fully understand the impact of the implementation of these zones on Barnsley.

Barnsley MBC's priorities for the coming year are:

1. To complete revocation of AQMA No. 5 within 2021 and completion of a Detailed Assessment recommending revocation of AQMA No. 1.
2. Where appropriate we will bid for funding for actions within our Air Quality Action Plan, as and when this funding become available.
3. Following a successful Defra joint air quality grant bid with our partners Doncaster MBC and Sheffield City Region, we will be completing a scheme involving temporary road closures around local schools, along with active travel initiatives in order to highlight the benefits of cycling and walking.
4. To continue to work with developers to minimise the air quality impact of new development, and to ensure that this development takes account of future sustainable transport modes, and in particular refine the Councils' requirement of electric vehicle charge points for new development in the Borough, in order ensure installation of the most optimum charge point schemes.
5. To align the Air Quality Action Plan with the Councils' Sustainable Energy Action Plan to ensure that the co-benefits of improved air quality and reduction in Carbon emissions in the Borough are maximised.
6. Continue monitoring both inside and outside of AQMAs to gauge progress with actions and ensure continued compliance outside of our AQMAs, and assess the continued direct and indirect impact of the pandemic and subsequent recovery on air pollution concentrations
7. To work with Public Health colleagues in order to raise awareness of poor air quality and action that can be taken to reduce emissions and develop programmes such as anti-idling and promotion of Clean Air Day.

8. To work with nearby local authorities who may be required to implement Clean Air Zones, to understand the impact of these zones may have on Barnsley.
9. To re-draft the Action Plan, in light of completion of the previous Action Plan 2016 to 2021 and development of the Councils' Sustainable Energy Action Plan

The principal challenges and barriers to implementation that Barnsley MBC anticipates facing are engaging with stakeholders (especially face-to-face) as we continue to deal with the impacts of the Pandemic. Working with local business (including bus fleets) will be affected by their striving to recover from the impact of the pandemic, for example, the bus fleets are expecting future projections of patronage post pandemic to be lower than previously, and this situation will be monitored closely by the Barnsley Bus Partnership.

Progress on the following measures has been slower than expected due to:

- Eco-driver training project – this project should have been completed by June 2020. As the training was primarily face-to-face, the project was halted due to the various lockdown restrictions. Following discussions with Defra an online training module was developed to encourage remote training, however this has resulted in extending the deadline for completion of the project to July 2021.
- Barnsley Bus Partnership Agreement – this has been a very difficult time for bus companies and this voluntary agreement will be reviewed in light of the pandemic, trends in patronage etc. Consequently, the voluntary agreement is being considered for a replacement with an enhanced statutory agreement. Further renewal to younger less polluting fleet will form part of this consideration.
- Encourage uptake of lower emission vehicles and alternative fuels - electric vehicle charging points capable of charging up to 40 vehicles at various car parks across Barnsley. This work was supposed to be undertaken in 2020, but was delayed until 2021 due to the pandemic

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Barnsley Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of AQMA 4 (Harborough Hill Road) and AQMA 6 (A616 Langsett), assuming that traffic flows return to at least pre-pandemic levels.

Barnsley Council has taken forward several direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Details of all measures completed, in progress or planned are set out in Table 2.2.

Other ongoing challenges and barriers to implementation that we have encountered continue to be identifying solutions to increased emissions due to gradients within two of AQMAs, without causing displacement of emissions elsewhere.

Previous ASRs have discussed at length the issues of increased emissions due to uphill gradient within two of AQMAs (AQMAs 4 and 6). With regard to AQMA 4 our position remains the same as detailed within last years' ASR, which is:

"We have discussed this with Defra officials, suggesting further national guidance be issued on how to deal with this issue. We believe that local circumstances dictate it would be extremely difficult to reduce the impact of gradient on emissions within this AQMA, without significant displacement of emissions elsewhere to nearby roads also with roads, significant gradient and adjacent relevant exposure.

This issue was previously raised within our 2017 and 2018 ASRs, and consequently, should opportunity arise, we would be happy to discuss issue at length with Defra and its representatives in order to identify a way forward." This position remains.

Monitoring data obtained within all our AQMAs are discussed in detail within the monitoring section of this report

We are aware that previous predictions of improved air quality have proved incorrect due to then unknown issues, such as primary NO_2 from vehicle exhausts, failure by Euro standards to achieve expected improvements etc. Furthermore, any predictions for compliance in Barnsley are based upon trends obtained from roadside diffusion tube data

In previous ASR appraisals' Defra have stated that *"it will remain an important focus in future ASR reports, that Action Plan measures should be reviewed in relation to their impacts on air quality, and whether there are adequate measures in place to provide the levels of emission reductions required to meet the air quality objectives"*.

For our 2018 ASR, Barnsley MBC therefore sought further clarification from the LAQM helpdesk on how this could be undertaken, particularly with regard to quantifying anticipated emission reduction in Table 2.2. The advice given by the Helpdesk is contained within appendix C.

To summarise this correspondence, the Helpdesk proposed the use of the below matrix in order quantify air quality impacts:

Figure 1 – Quantification of Emission Reduction

Costs		Air Quality Impacts		Timescale	
Score	Approximate Cost (£)	Score	Indicative Reduction in NO_2 Concentration		Years
7	<100k	7	>5 µg/m^3	Short (S)	< 2
6	100-500k	6	2-5 µg/m^3	↓	↓
5	500k-1million	5	1-2 µg/m^3		
4	1-10 million	4	0.5 - 1 µg/m^3		
3	10-50 million	3	0.2 – 0.5 µg/m^3	Medium (M)	2-5
2	50-100 million	2	0 - 0.2 µg/m^3	↓	↓
1	>100million	1	0 µg/m^3	Long (L)	>5

We therefore applied the criteria contained within this matrix to each of our actions within our Action Plan within previous Annual Status Reports and have continued using this matrix in our 2020 Annual Status Report. This comparison is detailed within Table 2.2. We note that this matrix provides an indicative reduction of NO_2. Clearly the highest scoring impacts are the most effective in improving air quality and moving towards compliance with the air quality objectives in the Borough. Table 2.2 below therefore details the progress with actions over the past year.

Table 2.2 – Progress on Measures to Improve Air Quality

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	Carriageway Improvements	Traffic Management	UTC, Congestion management, traffic reduction	2018	2021	LA Highways and Major Projects departments	Funding from Sheffield City Region Infrastructure Fund	No	Funded	£1m - £10m	Implementation	4, but scheme specific	Date of completion	Commencement of construction of the scheme	None
2	Barnsley Bus Agreement	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2016	2022	LA Transport Dept. and private company	Private funding source	No	Funded	£1 million - £10 million	Implementation	3 (estimated)	Uptake in Euro VI	Uptake in Euro VI buses, target 2022 49% or better. 2016/17 - 14%. 2017/18 18%. 2018/19 17%, end of 2019 21%	Potential Impact of Covid and lockdown on fleet renewal. Estimated funding cost due to funding from private source
3	Encourage uptake of lower emission vehicles and alternative fuels	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	2021	LA Housing & Energy Dept.	Joint funding from Office of Low Emissions grant award and BMBC funding	No	Funded	/£100k - £500k	Implementation	2 (estimated)	Date of completion (https://www.barnsley.gov.uk/news/electric-vehicle-charging-point-rollout-underway/)	BMBC received OLEV funding to deliver 43 dual 7 kW EVCPs (on-street charging infrastructure), with match funding also from BMBC.	It was hoped to complete this project in 2020, but delays due to current Covid-19 crisis meant postponing until 2021
4	Planning applications - air quality mitigation and assessment	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014-2015	2032	LA Environmental Health and Planning Departments	BMBC	No	Funded	£10k - £50k	Implementation	2 (estimated)	No of Planning Applications where AQ actions have been agreed / conditioned / recommended	17 planning applications in 2016, where AQ actions have been agreed / conditioned / recommended,35 in 2017, 40 in 2018, 43 in 2019, 213 in 2020	This action will be ongoing as BMBC guidance and planning documents continually are refined
5	Control over emissions from Part B and A2 processes, and act as consultees for Part A1 processes	Other	Other	2010	2032	LA Environmental Health Department	BMBC	No	Funded	£10k - £50k	Implementation	2 (estimated)	n/a	Ongoing	We await the Environmental Bill for any potential impacts on this action
6	Enforcement of Clean Air Act with regards to industrial smoke	Other	Other	2010	2032	LA Environmental Health Department	BMBC	No	Funded	£10k - £50k	Implementation	2 (estimated)	n/a	Ongoing	We await the Environmental Bill for any potential impacts on this action
7	Enforcement of Clean Air Act with regards to domestic smoke	Other	Other	2010	2032	LA Environmental Health Department	BMBC	No	Funded	£10k - £50k	Implementation	2 (estimated)	n/a	Ongoing	We await the Environmental Bill for any potential impacts on this action
8	Investigation of nuisance complaints, including appropriate action to resolve the complaint	Other	Other	2010	2032	LA Environmental Health Department	BMBC	No	Funded	£10k - £50k	Implementation	2 (estimated)	n/a	Ongoing	We await the Environmental Bill for any potential impacts on this action
9	BMBC Fleet improvements	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2016, preparation for future funding bids	2025	LA Fleet Operations Department	BMBC	No	Funded	The development of a comprehensive vehicle replacement strategy	Implementation	2 (estimated)	Number of Electric Vehicles purchased (minimum of 30)	30 procured so far	Vehicle Replacement Programme for 2021/22 should see a further 5 added to the council fleet.
10	ECO Stars HDV Fleet Recognition scheme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2012	2020	LA Transportation Department	Local Authority contribution and Defra AQ grant fund award	Yes	Funded	£50k - £100k	Completed	. 2 (estimated)	No of operators and vehicles signed up to the scheme. In 2018-19 These have been submitted to Defra in the final report.	2018-19 ECO Stars business targets met by Aug 19. ECO Stars NRMM feasibility study being undertaken,	Internal discussions on future of Eco Stars scheme and brand

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
														along with Future Business Model	
11	ECO Stars Taxi Fleet Recognition Scheme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2018	2019	LA Transportation Department	Defra AQ grant fund award	Yes	Funded	£10k - £50k	Completed	2 (estimated)	No of operators and vehicles signed up to the scheme. In 2018-19 These have been submitted to Defra in the final report.	Completed	Internal discussions on future of Eco Stars scheme and brand
12	Eco Driver Training Scheme	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2019	2020	LA Public Health and Environmental Health Departments	Defra AQ grant fund award	Yes	Funded	£50k - £100k	Implementation	2 (estimated)	No of operators and drivers signed up to the scheme	Scheme was progressing satisfactorily until Covid-19. Following discussions with Defra, training is now online	Completion now expected July 2021, with final report to follow this date
13	Barnsley Intelligent Transport Systems	Traffic Management	UTC, Congestion management, traffic reduction	2010	2020	LA Highways Department	BMBC	No	Funded	£1 million - £10 million	Completed		Installation of intelligent systems (SCOOT / MOVA) within AQMAs. Several of our AQMAs now have SCOOT / MOVA installed, with performance reviewed	Completed	Ongoing maintenance along with minor upgrades when funding allows
14	Encourage cycling and walking (developing infrastructure and campaigns)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2022	2023	LA Highways Department	Transforming Cities Fund for cycling and walking infrastructure	No	Funded	> £10m	Planning	2 (estimated)	Completion of schemes	Successful Sheffield City Region bid for £166 million. Barnsley to submit and implement schemes to this funding with schemes completed by March 2023	One scheme is designed to enhance walking and cycling routes to retail estates located close to AQMA 4.
15	Assessment of air quality impact of major traffic schemes	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018	**2032**	LA Environmental Health Department	BMBC	No	Funded	< £10k	Implementation	Assessment of proposed major road schemes	Assessment of air quality impact of major road schemes with allotted timescale	Assessments completed to allotted timescales	Ongoing subject to future road schemes
16	Promoting Travel Alternatives (Workplace travel planning; encourage/facilitate home-working; personalised travel planning; school travel plans)	Promoting Travel Alternatives	Workplace Travel Planning	2017-18	2019	LA Transportation Department	BMBC and developer contributions	No	Funded	£10k - £50k	Completed	2 (estimated)	Adoption of Sustainable Travel Supplementary Planning Document (SPD)	Adoption of SPD in 2019	SPD intended to be updated in 2021 to reflect latest developments in provision of electric vehicle charge points
17	Anti-idling policy feasibility study	Traffic Management	Anti-idling enforcement	2017-18	2020	LA Public Health and Environmental Health Departments	BMBC	No	Not Funded	£10k - 50k	Aborted	2 (estimated)	Number of participating organisations	None	This action intended to be renamed anti-idling raising awareness and run campaigns based on this theme. Unable to proceed due to Covid-19 and funding withdrawn to be used elsewhere

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm 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.

Barnsley MBC is taking the following measures to address $PM_{2.5}$.

Barnsley MBC does not monitor $PM_{2.5}$ particles. In order to obtain an indication of $PM_{2.5}$ concentrations within the Borough, we have therefore applied the procedure within paragraph 7.109 and Box 7.7 of LAQM.TG (16). This procedure uses a national PM_{10} to $PM_{2.5}$ annual mean conversion factor (0.7). This conversion has subsequently been applied to the last five years PM_{10} annual means recorded at our roadside Barnsley Kendray monitoring station. The below table details this conversion.

Year	2016	2017	2018	2019	2020
PM_{10} annual mean ($\mu g/m^3$)	22	17	18	20	20
$PM_{2.5}$ annual mean ($\mu g/m^3$)	15.4	11.9	12.6	14	14

Whilst these indicative $PM_{2.5}$ concentrations have been obtained from a roadside monitoring site; we note that concentrations have been greater than the World Health Organisation (WHO) annual mean guideline concentration of 10 $\mu g/m^3$.

Public Health England have created outcome framework indicators, one of these relates to fraction of mortality attributable to particulate air pollution[8]. The 2019 percentage for the

[8] https://data.england.nhs.uk/dataset/phe-indicator-30101

Barnsley Borough was 4.8%, whilst our 2020 Annual Status Report reported that the 2017 Public Health Outcome Framework, which relates to modelled $PM_{2.5}$ concentrations, show a modelled annual mean $PM_{2.5}$ concentration for Barnsley of 6.7 µg/m^3, compared to 7.3 µg/m^3 for the Yorkshire and the Humber region and 8.9 µg/m^3 for England as a whole.

Barnsley MBC is taking the following measures to address $PM_{2.5}$ emissions and concentrations:

Barnsley MBC has addressed the reducing emissions of $PM_{2.5}$ within our Air Quality Action Plan (AQAP) revised in 2017. Appendix G of our AQAP includes a further evaluation of actions, including an assessment of actions with regard to their effect of reducing $PM_{2.5}$ concentrations, in accordance with Table A.1 of LAQM TG (016), Action Plan Toolbox.

Applying Table A.1 therefore, all of the actions within the Plan will assist in reducing $PM_{2.5}$ concentrations, including those actions in the Plan which deal with industrial and domestic emissions, particularly actions five to eight which specifically target domestic and industrial $PM_{2.5}$ emissions. These actions are becoming increasingly important in reducing $PM_{2.5}$ emissions as domestic emissions have recently been identified as a significant source of $PM_{2.5}$ within the recently published Clean Air Strategy. The entire Barnsley borough is covered by smoke control orders.

The Clean Air Strategy, published this in 2019, demonstrated further commitment to reducing $PM_{2.5}$ concentrations, particularly domestic emissions. We therefore await for the forthcoming Environment Bill and subsequent clarification of the future role of local authorities and any additional duties in reducing emissions, particularly from domestic sources. We understand that the Enviroment Bill will become law either in 2021 or 2022. We also understand that the Government intends launching a consultation in early 2022 for a new legal target for $PM_{2.5}$ particles, with the further intention of making this law by October 2022.

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

This section sets out the monitoring undertaken within 2020 by Barnsley Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Barnsley Council undertook automatic (continuous) monitoring at three sites during 2020. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The Air Quality England webpage presents automatic monitoring results for Barnsley Council, with automatic monitoring results also available through the UK-Air website .

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.

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

Barnsley Council undertook non- automatic (i.e. passive) monitoring of NO_2 at sixty-four sites during 2020. 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. 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 2020 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.

Our air quality monitoring programme has been affected by the pandemic. Whilst provision of continuous monitoring data in 2020 has been largely unaffected, nitrogen dioxide diffusion tube sampling has affected, with some loss of data. This has been due to either lack of staff resource for changing the tubes at various periods, whilst on one occasion, the tubes being held in transit from the laboratory due to issues with the local postal service due to Covid. We have used the recently released LAQM Diffusion Tube Data Processing Tool for manipulation of the Borough's 2020 diffusion data, including annualisation, bias adjustment and distance correction. In doing so, we note that the local bias adjustment factor we have used for 2020 (0.84) is lower than local factors generated in previous years (typically approximately 0.9 to 1).

Furthermore, in line with the rest of the Country, local roadside and background NO_2 concentrations have been affected by the reduction in traffic emissions due to the various pandemic lockdowns. This impact is discussed further in Appendix F. The below discussion should therefore be considered in light of the two issues discussed above.

Consequently, the 2020 data within this report shows that annual mean NO_2 concentrations complied with the annual mean NO_2 objective for the first time under the Local Air Quality Management Regime. Table 2.1 shown earlier, details the highest 2020 annual mean concentration within each AQMA (taking into account relevant exposure at building façade). Furthermore, all distance corrected annual mean NO_2 data were below 36 µg/m^3 in 2020 both within our AQMAs and elsewhere.

Data from our roadside continuous oxides of nitrogen dioxide monitor within AQMA 2 (Barnsley A628 roadside) and the Barnsley Gawber urban background site were subject to an assessment of reduction in concentrations during the first lockdown in 2020 between 23rd March 2020 and 12th May 2020, using the analytical technique developed by Carslow[9].

In order to account for the confounding impact of the weather, national air quality experts have developed a statistical model to calculate the impact of the **first** lockdown on NO_2 concentrations.

This statistical analysis was subsequently undertaken comparing a "business as usual" expected NO_2 concentration and the actual monitored concentrations in lockdown for the period 23rd March 2020 (the start of lockdown) to 12th May 2020. This comparison indicated a welcome **37%** reduction in NO_2 concentrations at roadside (A628 Roadside) and **29%** reduction at background (Barnsley Gawber AURN) within Barnsley. These reductions were broadly consistent with estimated reductions elsewhere in the country.

The annual mean has now been met in **AQMA 1** in 2020 for the ten years running (diffusion tube numbers 28, 29 and 30 – due to the pandemic we were unable to change the tube at site diffusion tube number 10).

Maps showing the location of these diffusion tubes are found in Appendix D and considered to be representative of exposure throughout the AQMA, whilst figure A.1 below charts a five-year trend in concentrations.

In their 2014 autumn statement, the Department for Transport announced proposals to extend the managed motorway scheme along the M1 motorway from Junction 35a to Junction 39, which encompasses the majority of the Barnsley No. 1 AQMA in the Borough.

[9] Carslow, University of York, March 2020, Analysis of the Covid 19 Lockdown on UK Local Air Pollution

Within our previous ASRs we stated that we are awaiting further information about this proposed scheme before we proceed with any revocation.

As there will not be any development of a scheme to increase capacity on this section of motorway until after 2025 and monitored concentrations within the AQMA continue to be well below the annual average objective for NO_2, we are now considering revocation of this AQMA, even though any subsequent scheme may move emissions closer to receptors due to the potential for use of the current hard shoulder as a running lane. We recommended in our 2020 that we would subsequently draft a detailed assessment to provide the evidence and justification to revoke this AQMA This approach was approved when our 2020 Annual Status Report was appraised by Defra.

In undertaking such as an assessment we believe that account should be taken of any future scheme which may involve moving emissions closer to receptors by the addition of an all lane running scheme utilising the hard shoulder of the motorway. Consequently, we have been seeking Highways England comment regarding this situation, but as yet, have yet to receive their response. This has consequently delayed working on this detailed assessment.

All diffusion tubes within **AQMA 2A** recorded concentrations below 40µg/m^3 (distance corrected for exposure) in 2020, the third successive year of compliance within this AQMA. Annual mean Roadside and Kerbside concentrations were below 36µg/m^3 in 2020 within this AQMA.

Maps showing the location of these diffusion tubes are found in Appendix D, whilst figure A.1 below details charts a five-year trend in concentrations.

AQMA 2A along the A628 Dodworth Road can be split into two main links, these being the section between junction 37 of the M1 motorway and Pogmoor Crossroads, and the section from Pogmoor Crossroads to Town End Roundabout in Barnsley town centre. Both these sections recorded general reduction in concentrations in the period 2015 to 2018, with an increase or levelling off in concentrations in 2019, followed by the significant pandemic related reduction in 2020.

Further monitoring is required before revocation can be considered for this AQMA, as the 2020 data cannot be used to provide further evidence of compliance of the objective within this AQMA.

All data from diffusion tubes within **AQMA 4** (tube numbers 41, 43 as distance corrected for exposure and 44 at receptor facade), showed compliance of the annual mean objective

for the first time. Previously, there has been a levelling off in annual mean NO_2 concentration reductions in 2019, compared to earlier years, followed by the significant pandemic related reduction in 2020.

Maps showing the location of these diffusion tubes are found in Appendix D, whilst figure A.1 below details charts a five-year trend in concentrations.

As discussed in detail within previous Annual Status Reports, NO_2 concentrations within AQMA 4 (Harborough Hill Road) are significantly affected by increased emissions due to an uphill gradient, and we would welcome any further guidance on how this issue may be addressed.

AQMA 5 is located near to the junction of Rotherham Road and Burton Road on the outskirts of Barnsley town centre. Data from this AQMA has showed compliance for the last eight years, (as distance corrected for exposure in accordance TG (16) guidance). This AQMA was discussed at length in our 2020 Annual Status Report. Following Defra appraisal, it was agreed that we could then proceed to revocation of this AQMA. It was our intention to complete the revocation in time for reporting within this Annual Status Report, however revocation has been delayed in 2021. We have completed a consultation exercise and are now undertaking the legal process to revoke this AQMA - we expect that this AQMA will be revoked in the coming months. We will ensure that the relevant websites are then updated, and Defra informed accordingly. We will continue to monitor NO_2 concentrations within this AQMA to gauge ongoing compliance in future years.

For the first time in 2020, there was compliance in **AQMA 6** of the annual mean objective. Furthermore, this AQMA has been previously declared for both exceedances of the annual mean and 1-hour mean NO_2 objectives. LAQM.TG (16) states that concentrations over 60 $\mu g/m^3$ are at risk of exceeding the 1-hour NO_2 mean subject to exposure. In 2020, roadside concentrations were below 60$\mu g/m^3$ for the third year in succession, so we can assume that concentrations in areas of relevant exposure (gardens etc. where members of the public may be exposed for one hour or more) would have met the 1-hour objective in this AQMA.

To recall, our 2019 and 2020 Annual Status Reports reported on a study undertaken by Highways England to ascertain differences in traffic emissions along the A616 in Langsett with changing traffic flow, partly due to the impact of a junction within the AQMA on traffic emissions (right hand turn causing queuing traffic on an uphill gradient). The aim of this assessment was to determine whether traffic flow restrictions (removal of right-hand turn)

at this junction would reduce traffic emissions, and subsequently consider a traffic scheme to address this.

Consequently, it has been concluded that the results of the air quality monitoring data indicate that annual mean NO_2 concentrations are slightly higher when vehicles on the A616 are delayed by other vehicles turning right compared to vehicles that don't experience a delay. This change in concentrations is however considered likely to be beyond what could be reasonably monitored in terms of attributing any change to a specific intervention. Given the impact of any right turn ban or road closure Highways England have therefore concluded that it would not be proportional to pursue such an intervention.

Further ongoing roadside NO_2 monitoring data are required to assess future trends. However, the 2020 data will not provide a true reflection of long-term trends due to the impact of the lockdown on traffic flows. We intend to continue roadside monitoring at Langsett in future years.

Both Highways England and Barnsley Council will continue seeking feasible actions which could be implemented at Langsett, however, this is proving increasingly challenging as we consider the viability of actions, such as implementation of the right-hand turn discussed earlier. Highways England have implemented or considered various air quality interventions on their road network (http://assets.highwaysengland.co.uk/Corporate+documents/FINAL+-+HE+Research+Projects+to+Improve+Air+Quality.pdf), and consideration has been given to applying these to the situation at Langsett. Unfortunately, for various reasons, these actions have been considered unworkable at Langsett.

We would welcome any suggestions Defra may wish to make to progress this issue, as part of the statutory appraisal of this Annual Status Report.

In 2018, for the first time since declaration of **AQMA 7** in 2012, the tube located within this AQMA at the junction of Sheffield Road and Cemetery Road near Barnsley town centre was below 40 $\mu g/m^3$ when concentrations were distanced corrected back to nearest residential building facade. In 2019 however, concentrations exceeded the annual mean objective within this AQMA, but then again in 2020 the annual mean concentration at receptor façade complied with the annual mean objective. Maps showing the location of these diffusion tubes are found in Appendix D, whilst figure A.1 below details charts a five-year trend in concentrations.

The Council monitors diffusion tube NO_2 concentrations **outside our AQMAs** and discussion of new monitoring undertaken in 2020 is found below, along with discussion of the results.

Diffusion tubes 54 and 56 were re-located to the A616, just west of the AQMA 6 in Langsett, in order to further estimate the geographical extent of the impact of uphill gradient on emissions. 2020 data from these diffusion tubes is however of limited use due to the impact of the pandemic lockdowns on traffic flows and subsequent concentrations. Diffusion tube 18 was relocated further along Pogmoor Road close to AQMA 2A (A628 Dodworth Road) in to assess concentrations at roadside adjacent to a park playground. The 2020 annual mean NO_2 concentrations for DTs 18, 54 and 56 were 16.2 µg/m^3, 24.1 µg/m^3 and 25.9 µg/m^3 respectively.

We reported on DT53 within our 2020 Annual Status Report, which is located at roadside on the outbound carriageway of the A61 Sheffield Road between the Alhambra Roundabout and the junction with the A635 Taylor Row (Doncaster Road), Barnsley town centre (see maps in Appendix D). A potential exceedance of the annual mean NO_2 objective was possible at this location in 2019, subject to suitable exposure. We therefore proposed to undertake a detailed assessment with a view to declare an additional AQMA.

We had an initial discussion with the LAQM Helpdesk regarding the data from this diffusion tube and the circumstances of the monitoring location the data are considered to be representative. This communication is reproduced below10:

Barnsley MBC Question to Helpdesk

We have a recently located a NO_2 diffusion tube giving an annual mean 2019 concentration of 48.4 µg/m^3 at building façade, representing exposure at a row of buildings close to a busy arterial road. The diffusion tube is at a height of 2.8 metres above ground level. The buildings at ground level are a row of commercial properties (no relevant exposure), with flats at first floor level (and in some cases second floor level). Does the annual mean concentration at 2.8 metres represent exceedance of the annual mean objective at first and second floor and therefore should I consider declaration due to exceedance of the annual mean objective? Alternatively, is there another method of

[10] LAQM Helpdesk, personal communication March 2020

determining concentration at first floor and second floor level using the NO_2 annual mean concentration derived at 2.8 metres?

LAQM Helpdesk Response

In order to effectively determine concentrations at differing heights, it is recommended to carry out dispersion modelling of the area where receptors can be placed at specific levels representative of the sensitive receptors. It is a local authority's prerogative to declare an air quality management area, a process which may be based on either monitoring trends or a detailed study, and TG.16 recommends that monitoring must be undertaken in order to identify the requirement for such a study (para 7.508). It may be useful therefore to increase monitoring in the area to determine any further pollution hot spots and also assisting in the validity of your model, should it be decided to undertake one in support of your management area declaration.

We subsequently took these comments into account and have increased our monitoring in the area in early 2021. The 2020 for DT53 (annual mean) at roadside was 38.6 µg/m^3, with the Diffusion Tube Data Processing Tool predicting a distance corrected annual mean of 28.5 µg/m^3. On this basis therefore, we feel that we require more data from a "typical traffic flow year" before we proceed with any detailed assessment, due to the confounding nature of the 2020 data – we await to see whether 2021 will provide us with more "typical" data.. In order also to better address the issue of relevant exposure at above ground floor height, we are also endeavouring to find a suitable location to locate additional diffusion tubes at height.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

With regard to the 1-mean objective, the order for AQMA 6 (Langsett) was amended in 2016 to include exceedance of this mean. Concentrations at roadside have now dropped below 60µg/m^3 for the third year in succession, so we conclude that the 1-hour mean objective was not exceeded in the period 2018 to 2020 (we considered relevant exposure to be in the gardens of properties adjacent to the road within this AQMA). Further years data are however required before amendment of this AQMA to remove exceedance of the 1-hour mean objective can be considered.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

There have been no exceedances of the annual and 24-hour mean objectives for PM_{10} for the past ten years, taking into account that the 24-hour mean objective should not be exceeded more than 35 times per year.

3.2.3 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ monitoring is not undertaken by Barnsley MBC, however we have reported in earlier this ASR (section 2.3) of the procedure within paragraph 7.109 and Box 7.7 of LAQM.TG (16) for converting our roadside PM_{10} data to indicative $PM_{2.5}$ data.

3.2.4 Sulphur Dioxide (SO_2)

Table A.9 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2020 with the air quality objectives for SO_2. There have been no measured exceedances of the SO_2 objectives for the past ten years.

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)
CM1	Barnsley A635 Roadside	Roadside	436298	405691	PM_{10}	N	Beta Attenuation	n/a	5	1.45
CM2	Barnsley A628 Roadside	Roadside	432680	406174	NO_2	Y	Chemiluminescent	n/a	3.5	1.7
CM3	Barnsley Gawber	Urban background	432525	407475	NO_2, SO_2, O_3	N	Chemiluminescent, UV Fluorescence UV Absorption	n/a	n/a	4 (estimated)

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)
1	Midhopestones Eastbound	Roadside	423621	399817	NO_2	No	3.0	2.5	No	2.9
2	Langsett Stanley Cottages	Roadside	421102	400496	NO_2	Yes, AQMA 6	0.0	1.5	No	3.0
3	Footpath Sign, Sch. House, Langsett	Roadside	421143	400481	NO_2	Yes, AQMA 6	0.0	3.5	No	1.9
4	Langsett School House	Roadside	421126	400485	NO_2	Yes, AQMA 6	n/a	2.0	No	2.8
5	Langsett Café	Roadside	421291	400482	NO_2	Yes, AQMA 6	0.0	2.0	No	2.9
6	Langsett Wagon and Horses	Roadside	421282	400471	NO_2	Yes, AQMA 6	n/a	3.0	No	2.6
7	Gilbert Hill – Langsett	Roadside	421117	400501	NO_2	No	7.5	2.5	No	2.6
8	Langsett - Footpath Sign	Roadside	421215	400475	NO_2	Yes, AQMA 6	2.0	2.0	No	2.1
9	Claycliffe Rd / Barugh Lane	Kerbside	431468	408579	NO_2	No	0.0	1.5	No	2.8
10	Lansdowne Crescent, Darton	Urban Background	430820	409453	NO_2	Yes, AQMA 1	0.0	n/a	No	2.0
11	Dodworth Road	Roadside	434000	406292	NO_2	Yes, AQMA 2A	0.0	n/a	No	2.7
12	Dodworth Road	Roadside	433910	406290	NO_2	Yes, AQMA 2A	0.0	n/a	No	2.8
13	Traffic Lights Dodworth Rd	Roadside	433820	406278	NO_2	Yes, AQMA 2A	2.5	2.5	No	2.9
14	Dodworth Road	Roadside	432702	406160	NO_2	Yes, AQMA 2A	13.0	3.0	No	2.7
15, 16, 17	Pogmoor Crossroads	Roadside	432680	406174	NO_2	Yes, AQMA 2A	n/a	n/a	Yes	1.7
18	Pogmoor Road	Roadside	432603	406312	NO_2	No	n/a	5.3	No	2.8
19	Crown Hill Rd	Roadside	432481	406068	NO_2	Yes, AQMA 2A	0.0	n/a	No	2.8

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)
20	Dodworth Road – Pogmoor	Roadside	432535	406071	NO_2	Yes, AQMA 2A	7.5	1.5	No	3.0
21	Dodworth Rd, Pogmoor	Roadside	432402	406013	NO_2	Yes, AQMA 2A	8.0	3.0	No	2.9
22	Dodworth Rd, Pogmoor	Kerbside	432351	405985	NO_2	Yes, AQMA 2A	11.5	2.5	No	2.9
23	Dodworth Rd, Pogmoor	Roadside	432281	405951	NO_2	Yes, AQMA 2A	8.0	2.0	No	3.0
24	A6135 Hoyland	Kerbside	435274	400384	NO_2	No	6.5	1.0	No	2.8
25	A61 Sheffield Road Birdwell	Roadside	434832	400405	NO_2	No	3.0	1.5	No	2.9
26	A61 Sheffield Road, Birdwell	Roadside	434820	400421	NO_2	No	3.0	1.5	No	2.8
27	A61 Sheffield Road, Birdwell	Roadside	434823	400398	NO_2	No	n/a	n/a	No	2.9
28	Tankersley School	Roadside	434652	400231	NO_2	Yes, AQMA 1	0.0	n/a	No	2.8
29	Moor Lane, Birdwell	Urban Background	434721	400352	NO_2	Yes, AQMA 1	0.0	n/a	No	2.7
30	The Walk, Birdwell	Roadside	434309	401032	NO_2	Yes, AQMA 1	0.0	n/a	No	2.6
31	Sheffield Rd – Birdwell	Roadside	434595	401107	NO_2	No	3.5	2.5	No	3.0
32	Sheffield Rd Birdwell	Roadside	434559	401274	NO_2	No	0.0	n/a	No	2.8
33	Westway	Roadside	434251	406199	NO_2	No	0.0	n/a	No	2.9
34	Wakefield Road / Carlton Road	Roadside	435011	408281	NO_2	No	7.0	2.0	No	3.5
35	Wakefield Road / Carlton Road	Roadside	435027	408190	NO_2	No	n/a	n/a	No	2.8
36	Wakefield Road / Smithies Lane	Roadside	435027	408104	NO_2	No	6.5	2.0	No	2.7
37	W'field Road – Burton Road junction	Roadside	435174	407499	NO_2	No	5.8	1.7	No	2.8

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)
38	Old Mill Lane / Honeywell Street	Kerbside	434757	406995	NO_2	No	3.0	0.3	No	2.8
39	Burton Road – app R'ham Rd junc.	Kerbside	436072	407320	NO_2	Yes, AQMA 5	2.5	0.5	No	2.7
40	Grange Lane, nr Cundy Cross junc.	Roadside	437122	406557	NO_2	No	6.0	1.4	No	2.8
41	Harborough Hill Road	Roadside	434933	406695	NO_2	Yes, AQMA 4	8.0	2.0	No	2.7
42	Mottram Street / Eldon Street	Roadside	434727	406753	NO_2	No	0.0	n/a	No	2.8
43	Harborough Hill Road	Roadside	434955	406769	NO_2	Yes, AQMA 4	5.0	2.0	No	2.9
44	Harborough Hill Road, adj. gyratory	Roadside	435049	407047	NO_2	Yes, AQMA 4	0.0	n/a	No	2.9
45	Mexborough Road, Bolton-u-Dearne	Urban Background	445699	402140	NO_2	No	0.0	n/a	No	3.2
46	Nr supermarket site, Wombwell Lane	Kerbside	437554	405291	NO_2	No	4.0	0.7	No	3.2
47	Sheffield Road / Park Road Xrds	Roadside	434958	405672	NO_2	No	0.0	n/a	No	2.8
48	Sheff. Road / Cemetery Road Xrds	Roadside	434964	405709	NO_2	Yes, AQMA 7	1.5	2.0	No	2.7
49	Doncaster Road, Ardsley	Kerbside	437528	405675	NO_2	No	3.9	0.5	No	2.8
50	Carlton Road uphill	Roadside	435062	408244	NO_2	No	5.5	1.5	No	2.8
51	Carlton Road downhill	Roadside	435049	408229	NO_2	No	0.0	1.3	No	2.4
52	Wakefield Road / Bar Lane junction	Roadside	434112	409625	NO_2	No	2.8	1.6	No	2.7
53	Sheffield Road, town centre	Roadside	434809	406023	NO_2	No	2.5	0.3	No	2.8
54	Langsett, Car Park Sign	Roadside	421053	400489	NO_2	No	n/a	3.0	No	2.0

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)
55	Wombwell Lane, adj. Keel Inn	Roadside	437369	405456	NO_2	No	2.4	1.6	No	2.7
56	Langsett, 40 mph sign	Roadside	420982	400495	NO_2	No	n/a	1.8	No	2.0
57	Grange Lane, Stairfoot, northbound	Roadside	437242	405772	NO_2	No	1.5	1.5	No	2.8
58	Grange Lane, Stairfoot, southbound	Roadside	437250	405813	NO_2	No	2.3	2.3	No	2.9
BU1	Burton Road, 30 mph sign	Roadside	436069	407321	NO_2	Yes, AQMA 5	1.0	1.8	No	2.5
BU2	Burton Road, co-located DT 39	Kerbside	436072	407320	NO_2	Yes, AQMA 5	2.5	0.5	No	2.7
BU3	Burton Road, co-located DT 39	Kerbside	436072	407320	NO_2	Yes, AQMA 5	2.5	0.5	No	2.7
BU4	Burton Road, LC 33 - Downhill	Kerbside	436107	407307	NO_2	Yes, AQMA 5	12.0	0.1	No	2.7
BU5	Burton Road, LC 33 - Downhill	Kerbside	436107	407307	NO_2	Yes, AQMA 5	12.0	0.1	No	2.7
BU6	Burton Road, LC 33 - Downhill	Kerbside	436107	407307	NO_2	Yes, AQMA 5	12.0	0.1	No	2.7

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 (µg/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 2020 (%) (2)	2016	2017	2018	2019	2020
CM2	432680	406174	Roadside	99.3	99.3	36	35	32	32	25
CM3	432525	407475	Urban Background	97	97	19	16	16	17	12

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☒ **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 µg/m^3.

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

All means have been "annualised" as per LAQM.TG16 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/m^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 2020 (%) (2)	2016	2017	2018	2019	2020
1	423621	399817	Roadside	90.4	90.4	37.1	35.9	29.5	29.3	18.1
2	421102	400496	Roadside	82.7	82.7	**41.5**	37.4	34.5	33.8	23.5
3	421143	400481	Roadside	90.4	90.4	**62.3**	**60.9**	**49.5**	**49.0**	31.2
4	421126	400485	Roadside	90.4	90.4	**63.9**	**57.0**	**48.2**	**48.8**	31.5
5	421291	400482	Roadside	90.4	90.4	39.0	39.5	31.8	31.9	21.1
6	421282	400471	Roadside	90.4	90.4	**47.6**	**45.1**	39.3	38.8	24.2
7	421117	400501	Roadside	90.4	90.4	33.1	32.7	28.5	28.3	18.6
8	421215	400475	Roadside	90.4	90.4	**68.7**	**65.4**	**55.7**	**55.6**	36.2
9	431468	408579	Kerbside	82.7	82.7	32.8	31.9	27.7	31.7	19.2
10	430820	409453	Urban Background	15.4	15.4	29.1	26.9	22.2	24.4	-
11	434000	406292	Roadside	90.4	90.4	**43.2**	38.5	35.0	39.1	26.5
12	433910	406290	Roadside	57.7	57.7	**45.5**	**41.8**	38.9	38.9	25.3
13	433820	406278	Roadside	90.4	90.4	**45.1**	**43.9**	39.0	**43.3**	29.3
14	432702	406160	Roadside	90.4	90.4	**49.2**	**44.4**	39.4	**40.5**	26.6
15, 16, 17	432680	406174	Roadside	65.4	65.4	37.8	32.6	33.6	31.9	24.6
18	432603	406312	Roadside	80.8	80.8	36.9	34.1	27.6	30.3	16.2
19	432481	406068	Roadside	90.4	90.4	28.1	28.7	25.7	27.2	18.1
20	432535	406071	Roadside	90.4	90.4	**43.4**	**40.9**	37.0	39.6	29.3
21	432402	406013	Roadside	90.4	90.4	**51.1**	**49.1**	**45.8**	**46.2**	29.5
22	432351	405985	Kerbside	90.4	90.4	**52.7**	**50.0**	**44.2**	**48.1**	32.6
23	432281	405951	Roadside	90.4	90.4	**50.0**	**52.0**	**43.4**	**47.0**	28.9
24	435274	400384	Kerbside	90.4	90.4	32.5	**40.0**	30.2	30.3	20.6
25	434832	400405	Roadside	90.4	90.4	**42.9**	**40.2**	34.3	38.6	26.0
26	434820	400421	Roadside	90.4	90.4	**44.8**	**43.2**	**40.1**	**40.3**	25.7
27	434823	400398	Roadside	90.4	90.4	39.5	38.6	39.1	39.8	23.9
28	434652	400231	Roadside	90.4	90.4	25.5	22.6	23.9	23.6	15.1
29	434721	400352	Urban Background	90.4	90.4	31.3	32.1	27.6	28.3	17.8
30	434309	401032	Roadside	80.8	80.8	32.6	36.2	29.5	33.4	20.1
31	434595	401107	Roadside	82.7	82.7	33.2	31.8	29.7	29.7	19.1
32	434559	401274	Roadside	90.4	90.4	37.9	38.5	32.8	35.5	23.0
33	434251	406199	Roadside	90.4	90.4	31.8	30.9	29.0	31.2	18.7
34	435011	408281	Roadside	80.8	80.8	34.9	35.2	33.1	32.2	21.6
35	435027	408190	Roadside	90.4	90.4	**40.7**	38.7	37.4	35.9	25.7
36	435027	408104	Roadside	90.4	90.4	**42.9**	**43.4**	**40.1**	**40.3**	27.4
37	435174	407499	Roadside	90.4	90.4	34.3	33.4	30.2	32.3	21.0

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 2020 (%) [2]	2016	2017	2018	2019	2020
38	434757	406995	Kerbside	90.4	90.4	**41.9**	**43.4**	**40.4**	37.8	24.7
39	436072	407320	Kerbside	90.4	90.4	**46.4**	**45.0**	**44.4**	**41.9**	28.9
40	437122	406557	Roadside	90.4	90.4				**42.2**	30.0
41	434933	406695	Roadside	90.4	90.4	**69.1**	**68.7**	**59.3**	**60.3**	**42.4**
42	434727	406753	Roadside	90.4	90.4	34.0	33.6	31.4	28.1	21.9
43	434955	406769	Roadside	90.4	90.4	**66.5**	**65.8**	**59.7**	**58.9**	**41.4**
44	435049	407047	Roadside	90.4	90.4	**41.1**	**42.6**	37.2	39.1	27.4
45	445699	402140	Urban Background	15.4	15.4	24.1	24.8	21.7	22.6	-
46	437554	405291	Kerbside	90.4	90.4	**46.7**	**48.1**	38.4	**42.2**	29.0
47	434958	405672	Roadside	82.7	82.7	39.0	38.6	30.3	33.5	22.5
48	434964	405709	Roadside	90.4	90.4	**54.7**	**48.4**	**43.4**	**47.4**	32.1
49	437528	405675	Kerbside	90.4	90.4	**48.7**	**46.4**	39.0	**41.9**	30.2
50	435062	408244	Roadside	90.4	90.4				37.4	25.0
51	435049	408229	Roadside	82.7	82.7				31.0	20.4
52	434112	409625	Roadside	59.6	59.6				35.4	24.3
53	434809	406023	Roadside	90.4	90.4				**59.0**	38.6
54	421053	400489	Roadside	90.4	90.4					24.1
55	437369	405456	Roadside	90.4	90.4				**42.6**	27.0
56	420982	400495	Roadside	90.4	90.4					25.9
57	437242	405772	Roadside	90.4	90.4				38.9	29.1
58	437250	405813	Roadside	90.4	90.4				37.4	26.1
BU1	436069	407321	Roadside	82.7	82.7		30.3	33.9	36.3	25.6
BU2	436072	407320	Kerbside	82.7	82.7		33.9	38.8	**44.1**	29.2
BU3	436072	407320	Kerbside	82.7	82.7		35.2	**40.3**	**44.4**	29.4
BU4	436107	407307	Kerbside	75.0	75.0		39.4	33.9	**41.6**	27.1
BU5	436107	407307	Kerbside	75.0	75.0		36.8	34.7	38.7	26.9
BU6	436107	407307	Kerbside	75.0	75.0		**40.3**	37.2	39.8	27.7

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☒ **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 **bold and underlined**.

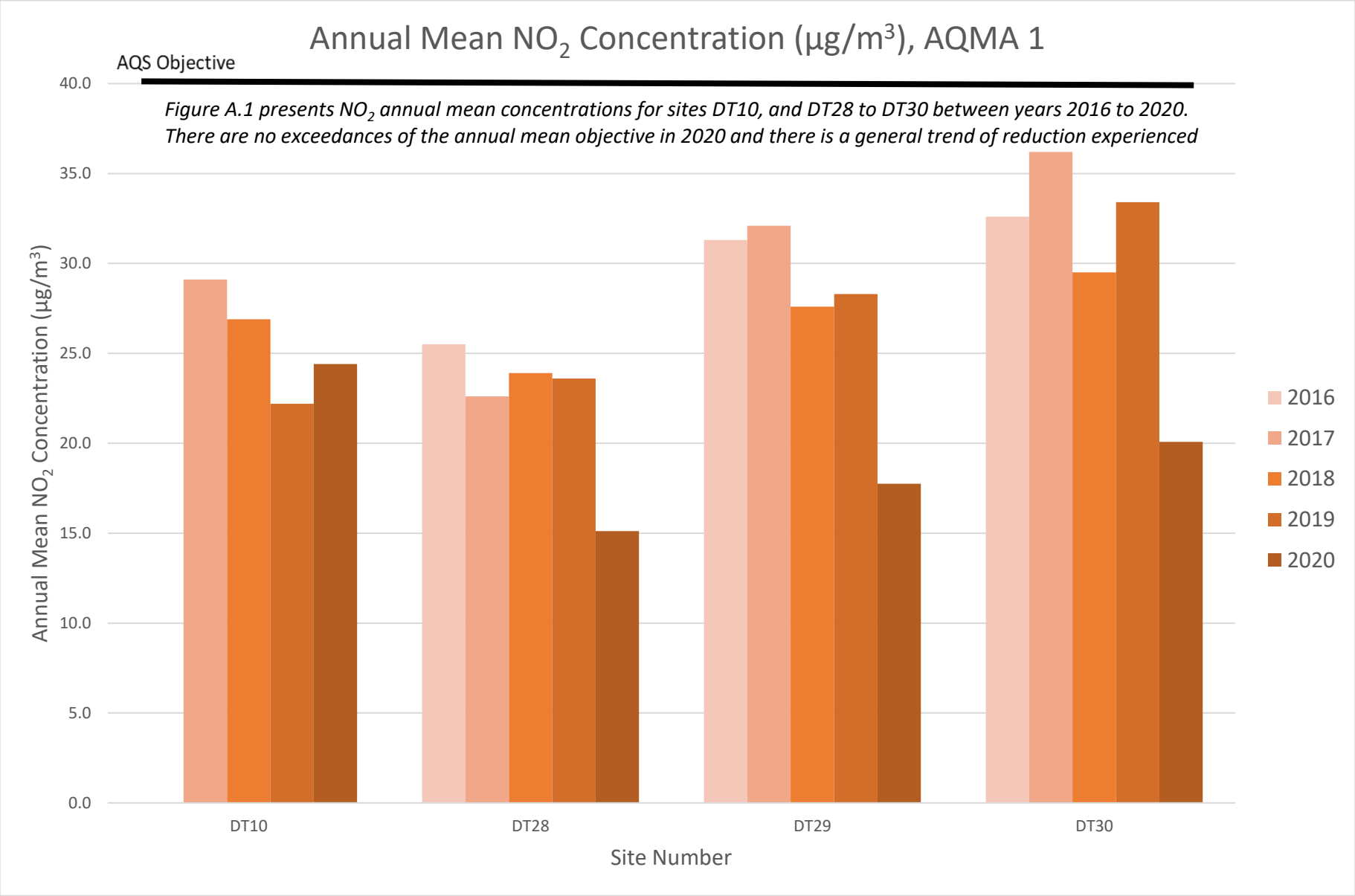
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

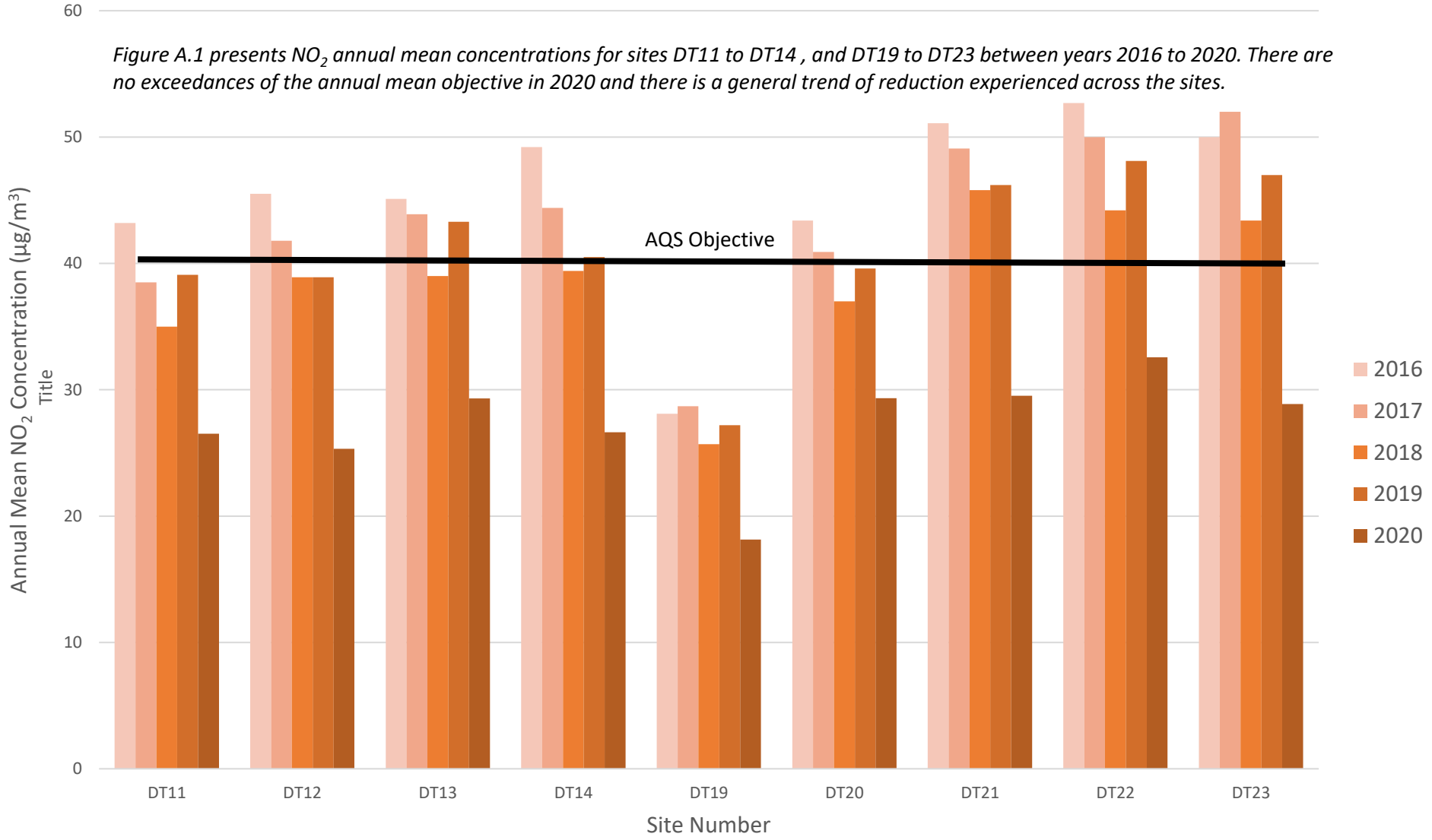
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

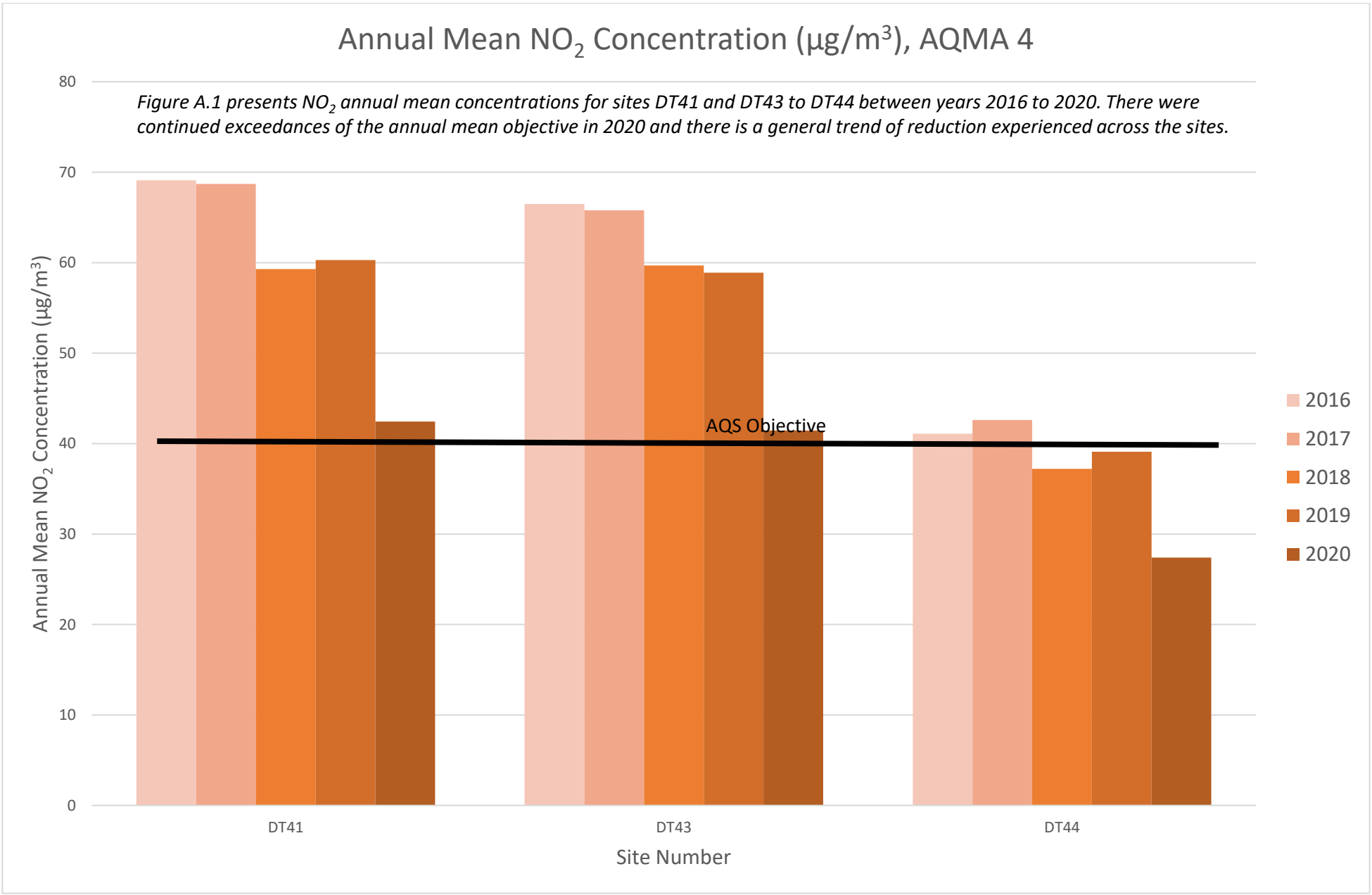
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

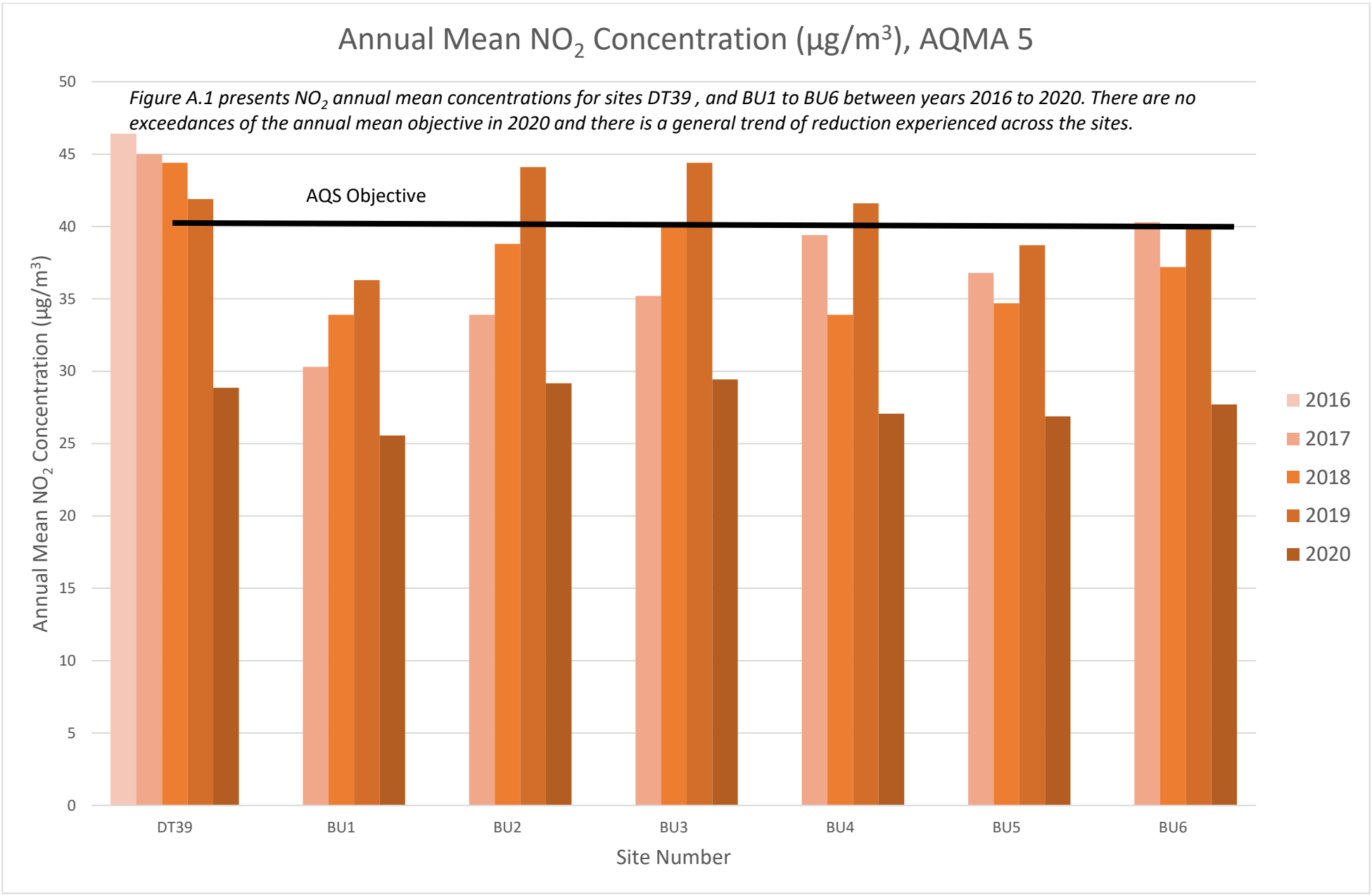
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

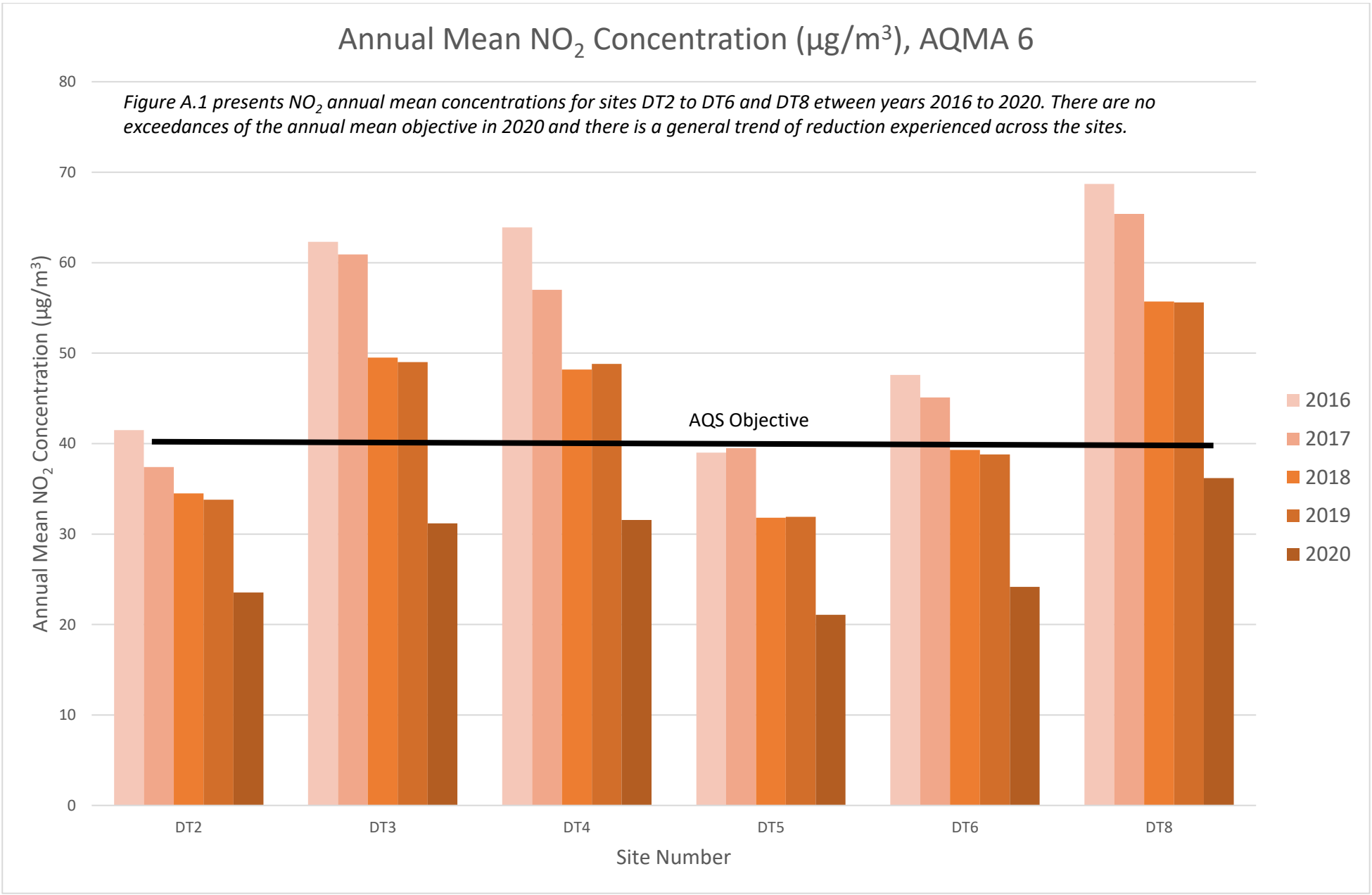
Figure A.1 – Trends in Annual Mean NO_2 Concentrations




Annual Mean NO2 Concentration (µg/m3), AQMA 2A
Figure A.1 presents NO2 annual mean concentrations for sites DT11 to DT14 , and DT19 to DT23 between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.
AQS Objective
Annual Mean NO2 Concentration (µg/m3)
Title
60
50
40
30
20
10
0
DT11
DT12
DT13
DT14
DT19
DT20
DT21
DT22
DT23
Site Number
2016
2017
2018
2019
2020


Annual Mean NO_2 Concentration (µg/m^3), AQMA 4
Figure A.1 presents NO_2 annual mean concentrations for sites DT41 and DT43 to DT44 between years 2016 to 2020. There were continued exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.
Annual Mean NO_2 Concentration (µg/m^3)
80
70
60
50
40
30
20
10
0
AQS Objective
2016
2017
2018
2019
2020
DT41
DT43
DT44
Site Number


Annual Mean NO_2 Concentration (µg/m^3), AQMA 5
Figure A.1 presents NO_2 annual mean concentrations for sites DT39 , and BU1 to BU6 between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.
AQS Objective
Annual Mean NO_2 Concentration (µg/m^3)
50
45
40
35
30
25
20
15
10
5
0
DT39
BU1
BU2
BU3
BU4
BU5
BU6
Site Number
2016
2017
2018
2019
2020


Annual Mean NO_2 Concentration (µg/m^3), AQMA 6
Figure A.1 presents NO_2 annual mean concentrations for sites DT2 to DT6 and DT8 etween years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.
Annual Mean NO_2 Concentration (µg/m^3)
80
70
60
50
40
30
20
10
0
AQS Objective
2016
2017
2018
2019
2020
DT2
DT3
DT4
DT5
DT6
DT8
Site Number

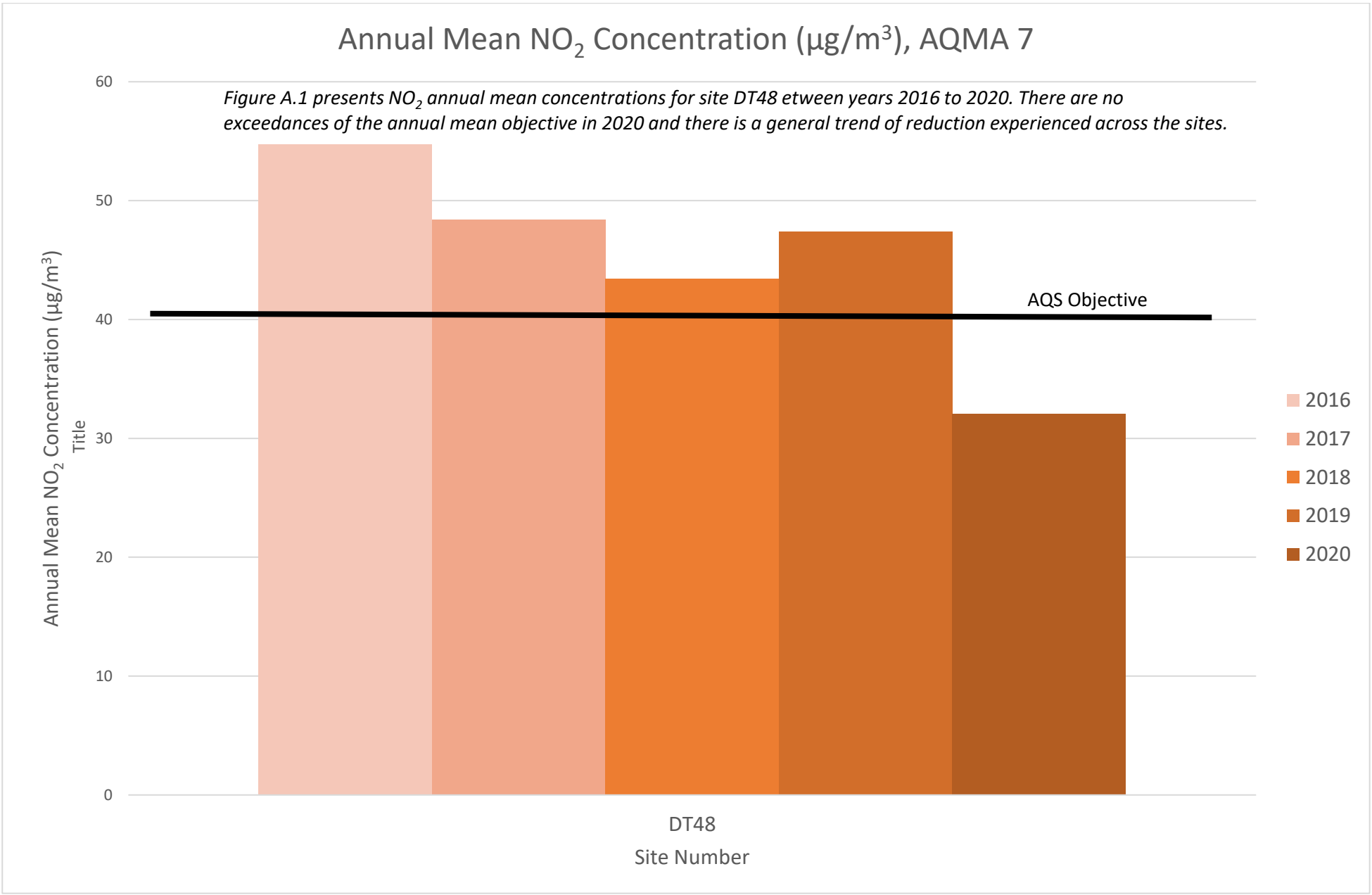

Annual Mean NO_2 Concentration (µg/m^3), AQMA 7
Figure A.1 presents NO_2 annual mean concentrations for site DT48 etween years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.
60
50
40
30
20
10
0
Annual Mean NO_2 Concentration (µg/m^3)
Title
AQS Objective
2016
2017
2018
2019
2020
DT48
Site Number

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 2020 (%) (2)	2016	2017	2018	2019	2020
CM2	432680	406174	Roadside	Automatic	99.3	2	4	0	0	0
CM3	432525	407475	Urban Background	Automatic	97	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%).

Figure A.2 – Trends in Number of NO_2 1-Hour Means > 200µg/m^3

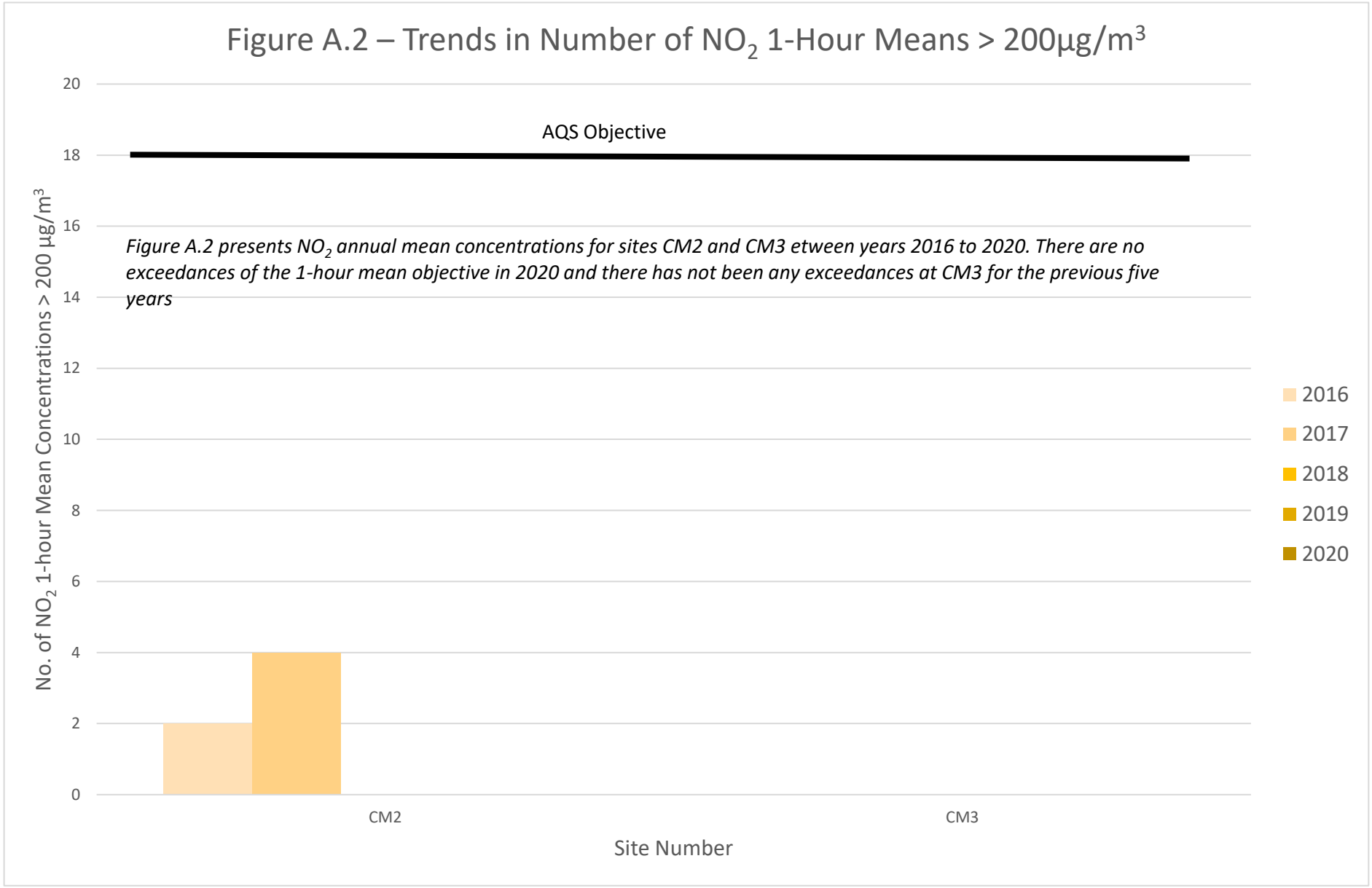


Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	436298	405691	Roadside	93.2	93.2	22	17	18	20	20

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

Notes:

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

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ are shown in **bold**.

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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.3 – Trends in Annual Mean PM_{10} Concentrations

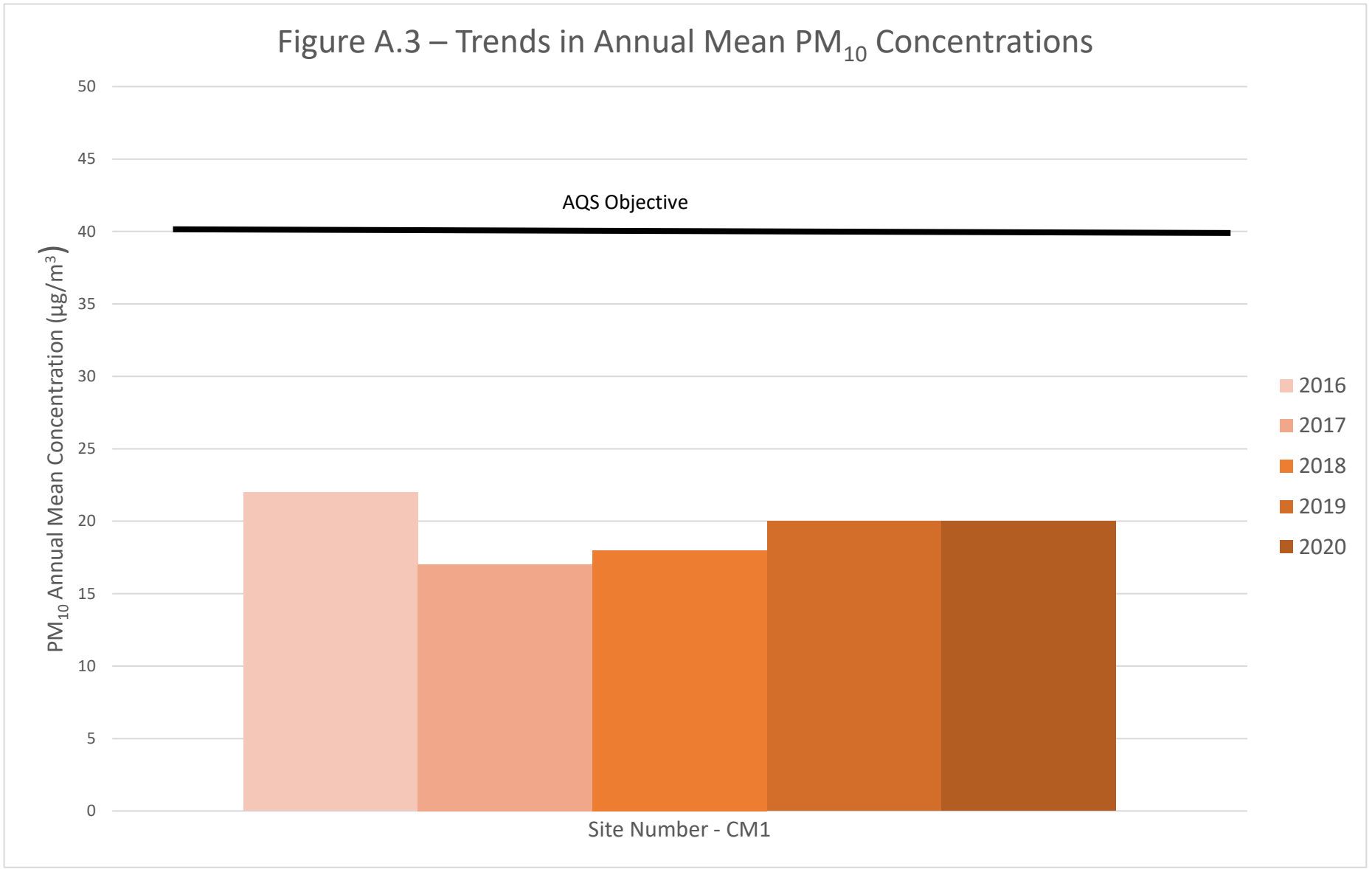


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	436298	405691	Roadside	93.2	93.2	11	5	5	11	3

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-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%).

Figure A.4 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m³

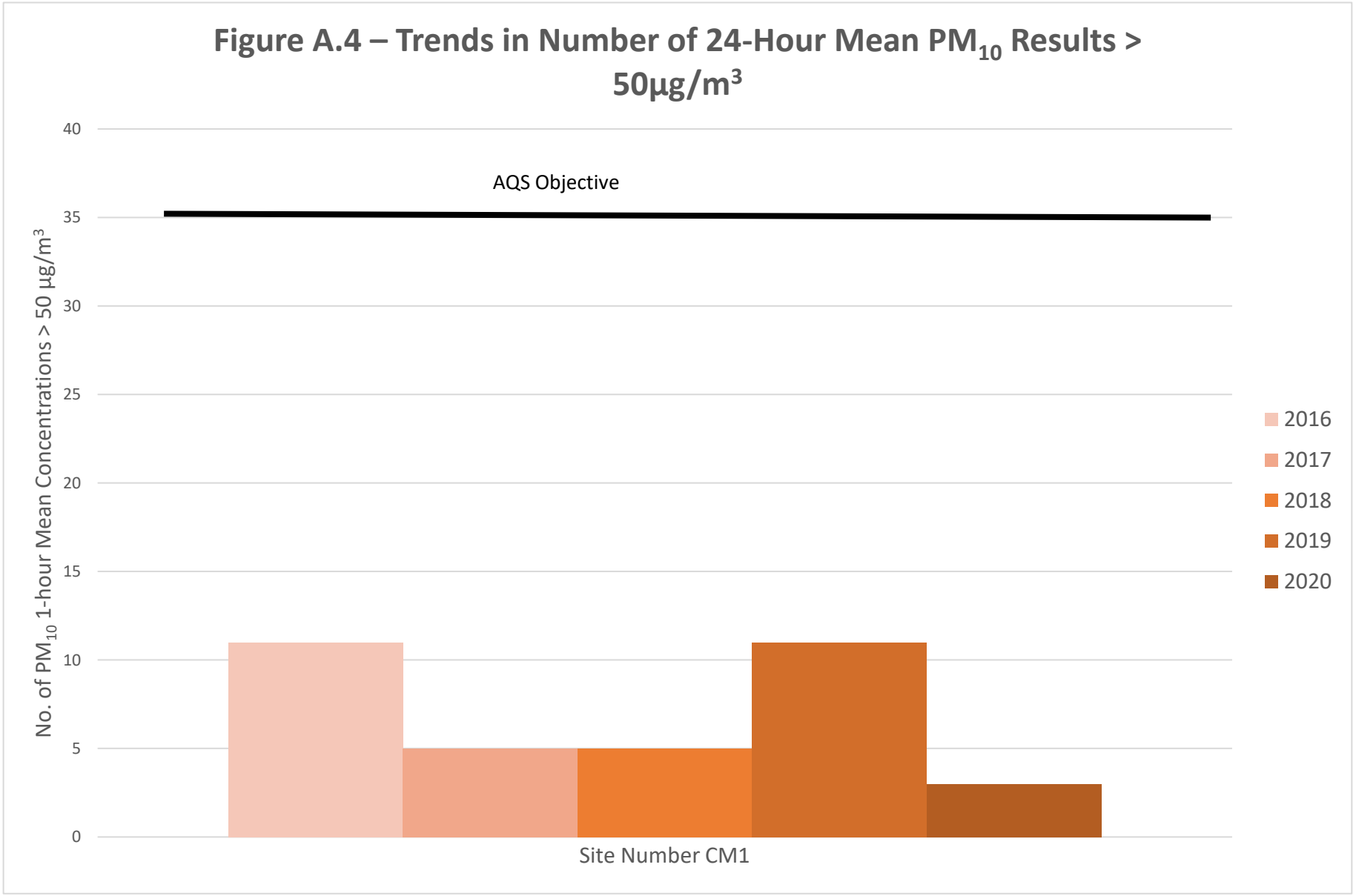


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020

Barnsley Council does not currently undertake $PM_{2.5}$ monitoring.

Figure A.5 – Trends in Annual Mean $PM_{2.5}$ Concentrations

Barnsley Council does not currently undertake $PM_{2.5}$ monitoring.

Table A.9 – SO_2 2020 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 2020 (%) (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
CM3	432525	407475	Urban Background	96	96	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 2020

Table B.1 – NO_2 2020 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	423621	399817	29.1	21.7	16.7		17.6	22.1	18.8	21.4	26.9	21.2	27.3		21.6	18.1	-	
2	421102	400496	33.6	29.4	21.6		22.7	34.9		26.2	34.8	27.4	31.9		28.0	23.5	-	
3	421143	400481	52.6	45.0	28.5		31.8	37.1	32.7	38.6	40.7	39.3	34.4		37.1	31.2	-	
4	421126	400485	47.6	46.6	26.3		32.6	42.9	33.2	39.8	44.5	36.8	38.2		37.5	31.5	-	
5	421291	400482	29.1	26.8	20.4		20.7	29.4	20.9	26.2	29.7	25.1	28.8		25.1	21.1	-	
6	421282	400471	30.3	29.0	25.1		28.0	32.3	25.2	28.4	38.2	27.9	29.4		28.8	24.2	-	
7	421117	400501	31.8	30.9	16.4		15.0	20.4	20.4	20.9	26.0	22.9	25.9		22.2	18.6	-	
8	421215	400475	52.2	53.0	39.3		35.8	42.9	36.3	40.4	49.2	41.9	48.0		43.1	36.2	32.3	
9	431468	408579	36.8	29.9	17.1		18.9	20.6	18.7	20.5	27.1	24.5			22.9	19.2	-	
10	430820	409453	29.7	23.7											-	-	-	
11	434000	406292	40.9	36.9	22.5		26.3	31.9	30.0	29.1	38.3	33.6	38.6		31.6	26.5	-	
12	433910	406290		27.9	24.9		26.5	36.3				36.9	37.2		30.8	25.3	-	
13	433820	406278	46.5	40.3	27.4		28.3	37.4	26.3	32.1	37.0	39.2	44.3		34.9	29.3	-	
14	432702	406160	42.8	41.0	22.7		26.6	28.6	28.2	26.2	35.8	37.6	39.8		31.7	26.6	-	
15	432680	406174	40.2	36.2				25.0	21.0	23.9	32.0	31.8	31.3		-	-	-	Triplicate Site with 15, 16 and 17 - Annual data provided for 17 only
16	432680	406174	41.6	38.4				29.5	23.2	25.8	32.3	28.8	33.1		-	-	-	Triplicate Site with 15, 16 and 17 - Annual data provided for 17 only
17	432680	406174	39.0	37.5				27.2	22.8	25.7	34.2	29.1	35.5		30.6	24.6	-	Triplicate Site with 15, 16 and 17 - Annual data provided for 17 only
18	432603	406312	30.3	27.1	16.0		13.4	19.3	12.3	17.1	23.6		20.7		19.2	16.2	-	
19	432481	406068	30.5	28.9	17.9		13.0	19.5	13.6	18.8	24.2	24.5	31.9		21.6	18.1	-	
20	432535	406071	44.9	43.7	30.4		26.7	34.1	27.8	28.3	38.2	42.4	40.8		34.9	29.3	-	
21	432402	406013	47.4	44.1	24.9		26.8	32.7	30.0	34.3	41.9	38.4	44.2		35.1	29.5	-	
22	432351	405985	53.5	48.8	27.3		28.4	36.5	36.3	37.1	45.2	38.9	51.6		38.7	32.6	-	
23	432281	405951	50.3	44.0	21.8		25.9	31.6	31.2	33.6	41.5	37.6	41.9		34.4	28.9	-	
24	435274	400384	34.6	30.0	18.4		17.5	24.0	18.7	25.9	27.5	23.9	32.7		24.5	20.6	-	
25	434832	400405	38.9	31.4	26.9		25.1	32.9	21.4	30.3	36.9	34.4	37.7		31.0	26.0	-	
26	434820	400421	32.8	30.0	28.6		26.2	34.2	20.6	30.6	36.8	31.9	38.8		30.6	25.7	-	
27	434823	400398	34.8	28.5	21.2		20.2	30.6	22.8	29.2	36.5	31.4	39.0		28.4	23.9	-	
28	434652	400231	20.9	20.4	17.2		11.9	20.5	9.6	19.0	22.0	18.3	22.7		18.0	15.1	-	
29	434721	400352	27.9	28.3	18.7		14.5	18.4	14.7	19.2	23.1	23.4	27.8		21.1	17.8	-	
30	434309	401032	36.9	30.0	20.0		19.0	20.4	19.6	16.6	29.0		33.2		23.9	20.1	-	
31	434595	401107		25.7	19.7		15.4	24.5	15.5	21.7	25.8	29.2	30.9		22.7	19.1	-	
32	434559	401274	37.8	33.0	20.6		18.4	26.3	19.5	25.7	29.7	31.3	40.4		27.4	23.0	-	
33	434251	406199	32.5	29.5	16.9		15.9	18.8	15.4	19.4	26.5	24.4	31.9		22.3	18.7	-	
34	435011	408281	36.7	29.8	20.1			25.8	14.8	21.6	25.5	28.4	35.5		25.7	21.6	-	
35	435027	408190	42.1	34.2	23.9		23.6	33.1	22.4	25.6	33.1	37.2	39.9		30.6	25.7	-	
36	435027	408104	46.3	38.7	23.5		29.1	31.9	27.6	27.5	35.1	36.9	40.8		32.6	27.4	-	
37	435174	407499	35.9	26.0	18.7		19.8	28.4	16.6	21.4	27.1	30.7	33.4		25.0	21.0	-	
38	434757	406995	41.7	35.8	22.2		20.8	28.1	24.2	25.3	36.2	32.0	40.0		29.4	24.7	-	
39	436072	407320	40.5	34.7	28.1		28.6	35.8	24.8	33.2	43.7	39.5	43.3		34.3	28.9	-	
40	437122	406557	43.5	37.2	26.5		30.4	44.2	27.0	35.3	42.4	39.5	42.6		35.7	30.0	-	
41	434933	406695	62.6	50.9	35.4		40.2	50.8	44.2	51.2	64.1	58.2	65.7		50.5	**42.4**	31.0	
42	434727	406753	37.9	32.7	22.6		16.0	24.1	18.0	22.9	30.7	28.4	35.2		26.1	21.9	-	
43	434955	406769	55.6	53.3	44.5		42.5	44.3	42.2	51.5	51.7	51.7	61.5		49.3	**41.4**	32.8	
44	435049	407047	43.7	37.1	30.2		23.0	32.8	25.3	32.0	34.0	33.5	39.6		32.6	27.4	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
45	445699	402140	31.3	23.7											-	-		
46	437554	405291	43.6	40.7	31.0		28.9	35.2	28.0	30.3	38.5	32.4	44.1		34.5	29.0		
47	434958	405672		32.8	24.2		16.5	31.0	17.8	26.4	29.0	30.9	37.4		26.8	22.5		
48	434964	405709	45.1	34.6	35.5		31.1	47.1	27.4	35.9	49.4	38.7	44.6		38.2	32.1		
49	437528	405675	45.2	36.4	31.7		27.8	44.3	26.1	30.0	43.8	38.4	45.2		35.9	30.2		
50	435062	408244	43.7	36.4	23.9		22.6	32.0	21.0	25.9	35.7	27.9	39.7		29.8	25.0		
51	435049	408229		29.5	19.8		17.4	30.5	18.8	23.4	23.0	27.7	34.4		24.3	20.4		
52	434112	409625	32.9				23.4	33.8		25.3	31.8	29.0	37.4		29.9	24.3		
53	434809	406023	53.1	38.9	41.4		41.0	57.6	34.6	44.6	55.2	44.2	57.1		45.9	38.6	28.5	
54	421053	400489	34.8	29.3	22.4		24.1	36.7	20.5	30.7	35.6	26.7	35.2		28.7	24.1		
55	437369	405456	39.1	32.6	26.9		28.8	36.2	26.1	30.7	36.0	31.1	41.1		32.1	27.0		
56	420982	400495	34.9	28.0	27.7		27.3	38.1	23.2	33.8	36.9	27.0	35.8		30.8	25.9		
57	437242	405772	56.4	40.4	29.3		24.4	32.7	22.1	25.5	34.5	38.9	52.7		34.6	29.1		
58	437250	405813	43.4	32.5	25.0		25.0	38.0	20.2	30.7	31.9	29.8	42.3		31.0	26.1		
BU1	436069	407321	35.5	29.6	28.6		27.1	40.0	20.4	27.9	36.1	32.8			30.4	25.6		
BU2	436072	407320	40.2	36.8	33.2		30.5	40.7	25.0	32.8	41.7	36.1			34.7	29.2		
BU3	436072	407320	42.4	38.9	32.2		31.3	41.0	26.2	32.1	41.0	36.2			35.0	29.4		
BU4	436107	407307	41.5		26.6		22.0	31.5	22.0	30.8	33.4	29.6			29.1	27.1		
BU5	436107	407307	42.4		26.0		22.8	31.3	20.5	28.1	34.0	31.6			28.9	26.9		
BU6	436107	407307	41.3		28.7		24.9	31.1	26.0	27.0	31.5	31.6			29.8	27.7		

☒ **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.TG16.**

☒ **Local bias adjustment factor used.**

☐ **National bias adjustment factor used.**

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

☒ **Barnsley Council confirm that all 2020 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 **bold and underlined**.

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 Barnsley Council During 2020

Air quality assessments have been undertaken in support of various planning applications in 2020, which have potential to impact on local air quality. In addition, following adoption of the Councils' Local Plan in 2019, the Council has been developing Masterplan Frameworks as Barnsley's Local Plan includes some site allocations which require the production of such a framework. Masterplan frameworks are subject to public consultation and approval by the council prior to the determination of any planning applications on the affected sites. Air quality impact has been included within these frameworks in order to ensure that this is considered appropriately at subsequent planning stage.

The Council has its own Air Quality and Emissions Good Practice Planning Guidance (https://www.barnsley.gov.uk/media/16257/pdc-2020-mar-bmbc-aqe-technical-planning-guidance-v12.pdf) which requires that air quality impact from future development are reasonably mitigated.

Specifically, in 2020, the following significant planning applications were assessed for air quality impact:

2020/0647 - Hybrid planning application for a development up to 103,086sqm of employment uses (use classes B1/B2 and B8)

2020/0027 and 2020/0028 - Hybrid planning application for a development up to 103,086sqm of employment uses (use classes B1/B2 and B8)

2020/1005 - Outline planning permission (with all matters reserved except access) for redevelopment of the site to include up to 500 residential units

Additional Air Quality Works Undertaken by Barnsley Council During 2020

Barnsley Council has not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

Nitrogen dioxide diffusion tubes for 2020 were analysed by the South Yorkshire Air Quality Samplers. This laboratory uses the analytical technique of the grid adsorbent being 50% triethanolamine (TEA) in acetone. Reagents used in the analysis are sulphanilamide and NEDA. The analytical technique used is spectrometry, at a wavelength of 540 nanometres.

South Yorkshire Air Quality Samplers participates in the WASP / AIR PT scheme for nitrogen dioxide and has previously participated within the survey's inter laboratory comparison scheme. Laboratory performance during 2020 was based on rounds AR036 to AR040 of the AIR PT annual performance criteria for NO_2 diffusion tubes used in Local Air Quality Management. For AIR PT rounds AR036 to AR040, the results of the measurements based up a satisfactory z-score of < +/- 2 are detailed in the below table:

AR036 **Jan – Feb 2020**	**AR037** **May – Jun 2020**	**AR039** **July – Aug 2020**	**AR040** **Sep-Oct 2020**
100%	NR	NR	100%

No results were obtained for rounds AR037 and AR039 as these rounds were cancelled due to the pandemic.

The most important factors to be considered when deciding which bias-adjustment factor to use are:

- Tube exposure time (in our case 1 month)
- Length of the monitoring study (one year)
- QA/QC of the chemiluminescence analyser (carried out locally by Ricardo including data ratification, as part of our "Calibration Club" contract)
- QA/QC of diffusion tubes (Air PT NO_2)

- Siting of the co-location study (if roadside tubes are being factored it is important to use a roadside factor)
- Siting of other tubes in the survey

Due to the pandemic, there were periods when the monitoring diverged the 2020 Diffusion Tube Monitoring Calendar. The first instance was during March and April 2020, when the March tubes were not collected, and the April tubes not exposed. In addition, at the beginning January 2021, the December 2020 tubes were not collected, and the January tubes not exposed.

In addition, the August diffusion tubes were collected a week later than that recommended by the calendar (and the September tubes exposed a week later).

Advice was subsequently obtained from the LAQM Helpdesk, who commented below:

"*Thank you for contacting the LAQM Helpdesk. Your query has been allocated the unique reference code **7040** and you should use this as a reference for any further follow up regarding the below response.*

Thank you for your email. The Supplementary Guidance for LAQM Reporting in 2021 (https://laqm.defra.gov.uk/supporting-guidance.html) addresses potential impacts from COVID-19, and discusses the issues you mention below.

In summary, the guidance specifies that in some cases use of a time-weighted average may be appropriate (as described in TG16 paragraph 7.197) to account for variable exposure periods, and you are correct in that the new Diffusion Tube Data Processing Tool will automatically perform a time-weighted annual mean calculation, as opposed to a simple average calculation, if the required criteria are met.

In cases where tubes have been exposed for longer than the period recommended by the lab, the guidance recommends that lab advice on the treatment of the data should be adhered to. We would therefore advise that you contact your lab initially to obtain advice on the accuracy of the data, given the exposure length. For example, the tubes will have an expiry date and, in cases where the lab may have closed (such as during the first period you have mentioned below), the key time period to consider may be that from when the tubes were deployed to the date analysed. If you suspect the tubes may have expired by the time they have been analysed then it may be preferable to exclude the data.

Otherwise, using the risk matrix in the supplementary guidance linked above (pg 9 – 11), we would suggest potentially only a 'medium' risk with the 8 weeks exposure period (if the

tubes were analysed straight away rather than stored for a period). It would also be worth seeing whether the concentrations seem sensible in comparison to any available traffic flow measurements. For example, if the concentrations are 50% lower than 'normal' and the traffic was also 50% lower, then it may be that the data look reasonably sensible.

With regards to the tubes exposed during the December - February exposure period, it may be preferable to consider discarding this data since it covers the two calendar years.

The main thing to consider is whether you are able to robustly justify a decision to either include or exclude data, on the basis of the explanation provided above, and these decisions should be discussed in the main ASR document."

This issue was then subsequently discussed with the laboratory, South Yorkshire Air Quality Samplers, who were satisfied that a longer exposure time would not have a significant impact on data quality. Furthermore, we rejected the December 2020 data as recognised in the LAQM helpdesk response above.

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. Our 2020 diffusion tube data has been annualised where required using Defra's Diffusion Tube Data Processing Tool v1.1, following guidance within Chapter 7 of LAQM.TG16: NO_x and NO_2 Monitoring, including the procedure laid out in Box 7.10. The four background continuous monitoring sites within 50 kilometres in order to calculate the annualisation factors were Barnsley Gawber, Dewsbury Ashworth Grove, Sheffield Devonshire Green and Leeds Centre. Annualised data is presented in Table C.2 below. The diffusion tubes sites requiring annualisation of 2020 data are DT12, DT15, DT16, DT17, DT52, BU4, BU5 and BU6.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020 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.TG16 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.

Barnsley Council have applied a local bias adjustment factor of 0.84 to the 2020 monitoring data. A summary of bias adjustment factors used by Barnsley Council over the past five years is presented in Table C.1. Barnsley Council have previously obtained their locally derived bias adjustment factor for previous Annual Status reports from a single study of triplicate tubes co-located with our A628 Pogmoor Roadside continuous monitor. It must be noted for the period 2016 to 2019, the factor varied between 0.94 and 1.03, compared to the 2020 factor of 0.84. Nevertheless, we have taken the decision to continue with the locally derived factor of 0.84 for 2020 for continuity and consistency. We are however aware of neighbouring South Yorkshire local authorities, who also use the same laboratory, tubes and analytical technique producing factors of between 0.9 and 1 for 2020.

Our 2020 bias adjustment factor has been calculated using the Diffusion Tube Data Processing Tool.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	Local	-	0.84
2019	Local	-	0.98
2018	Local	-	0.95
2017	Local	-	1.03
2016	Local	-	0.94

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be 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. Subsequently, following use of the Diffusion Tube Data Processing Tool, our distance corrected data is found within Table C.4. Please note, the distance correction has only been applied for our monitoring sites where the roadside / kerbside annual mean concentration is greater than 36µg/m^3 and the sites are not located at a point of relevant exposure (taking the limitations of the calculator into account).

QA/QC of Automatic Monitoring

This station provides the automatic data, which is used to derive the locally derived bias adjustment factor discussed above, live and historic data can be viewed at the Air Quality England website (https://www.airqualityengland.co.uk/). All 2020 data have been ratified.

Site	Status	Address	Grid Ref
A628 Roadside	Roadside	Pogmoor Crossroads, A628 Dodworth Road	432680 406174

Details of the analyser QA/QC are contained in the table below:

Station	A628 Roadside
Analyser Model	Thermo Scientific 42i Oxides of Nitrogen analyser
Logging System	Internal to Thermo Scientific 42i
Calibration gas	NO in N_2
Routine Calibration	Calibrations undertaken by Barnsley MBC personnel as Local Site Operator
Daily zero and span check	Yes
Air Conditioning	Yes
Service contract	2020, 2 x 6 monthly service, + repair call out (Matts Monitors)
Third party Audit and data ratification	Ricardo-AEA Air Monitoring Calibration Club. 2 x 6 monthly audits of the analyser, calibration gas mixture and site infrastructure, along with full data ratification and reporting of the dataset

Barnsley Gawber AURN

Site	Status	Address	Grid Ref
Barnsley Gawber	Urban Background, AURN	Wood View, Gawber, Barnsley	432524 407478

Further details on the location criteria of the Barnsley Gawber site can be found on the UK Air website, https://uk-air.defra.gov.uk/, along with live and historic data. All 2020 data have been ratified. Details of the analyser QA/QC are contained in the table below:

Station	Barnsley Gawber
Analyser Model	Thermo Scientific Model 42i
Logging System	Internal to Model 42i
Calibration gas	NO in N_2
Routine Calibration	Calibrations undertaken by Barnsley MBC personnel as Local Site Operator
Daily zero and span check	Scrubbed zero air. Permeation tube
Air Conditioning	Yes
Service contract	2 x 6 monthly service, + repair call out (ACOEM)
Third party Audit and data ratification	Ricardo-AEA, as part of AURN

Sulphur Dioxide

Barnsley Gawber AURN

Site	Status	Address	Grid Ref
Barnsley Gawber	Urban Background, AURN affiliated	Wood View, Gawber, Barnsley	432524, 407478

Further details on the location criteria of the Barnsley Gawber site can be found on the UK Air website, https://uk-air.defra.gov.uk/, along with live and ratified data. All 2020 data have been ratified. Details of the analyser QA/QC are contained in the table below:

Station	Barnsley Gawber
Analyser Model	Thermo Scientific Model 42i
Logging System	Internal to Model 42i
Calibration gas	SO_2 in air
Routine Calibration	Calibrations undertaken by Barnsley MBC personnel as Local Site Operator
Daily zero and span check	Scrubbed zero air. Permeation tube

Air Conditioning	Yes
Service contract	2 x 6 monthly service, + repairs (ACOEM)
Third party audit and data ratification	Ricardo-AEA, as part of AURN

Fine Particles (PM_{10})

Automatic PM_{10} monitoring

Automatic monitoring of PM_{10} using a beta attenuation monitor (BAM) are undertaken at the A635 Kendray Roadside site. live and historic data can be viewed at the Air Quality England website (https://www.airqualityengland.co.uk/). All 2020 data have been ratified. QA/QC for the Kendray site is detailed below:

Barnsley A635 Roadside, Doncaster Road, Kendray

Site	Status	Address	Grid Ref
Doncaster Road, Kendray	Roadside	A635 Doncaster Road, Kendray	436299 405690

Details of the analyser QA/QC are contained in the table below:

Station	A635 Roadside
Analyser Model	BAM 1020
Logging System	Internal to the BAM
Filter Change	Filter changes undertaken by Barnsley MBC personnel as Local Site Operator, in accordance with manufacturer's specification and AURN procedure.
Air Conditioning	Yes
Service contract	2020, 2 x 6 monthly service, + repair call out (Matts Monitors)
Third party Audit and data ratification	Ricardo-AEA Air Monitoring Calibration Club. 2 x 6 monthly audits of the analyser, calibration gas mixture and site infrastructure, along with full data ratification and reporting of the dataset

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The Barnsley BAM is unheated, so the PM_{10} data reported within this Annual Status Report were multiplied by a correction factor of 0.833 following the TG16 method by the contractor who undertakes ratification of our PM_{10} data.

Automatic Monitoring Annualisation

All automatic monitoring locations within Barnsley recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be 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 Barnsley required distance correction during 2020.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Barnsley Gawber	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Sheffield Devonshire Green	Annualisation Factor Leeds Centre	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT12	0.9868	0.9284	1.0066	0.9991	0.9802	30.8	30.1	
DT15	0.9656	0.9379	0.9875	0.9264	0.9544	-	-	Triplicate Site with 15, 16 and 17 - Annual data provided for 17 only
DT16	0.9656	0.9379	0.9875	0.9264	0.9544	-	-	Triplicate Site with 15, 16 and 17 - Annual data provided for 17 only
DT17	0.9656	0.9379	0.9875	0.9264	0.9544	30.6	29.2	Triplicate Site with 15, 16 and 17 - Annual data provided for 17 only
DT52	0.9696	0.9269	0.9884	0.9798	0.9662	29.9	28.9	
BU4	1.1053	1.0949	1.1025	1.1200	1.1057	29.1	32.2	
BU5	1.1053	1.0949	1.1025	1.1200	1.1057	28.9	32.0	
BU6	1.1053	1.0949	1.1025	1.1200	1.1057	29.8	33.0	

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	8				
Bias Factor A	0.84 (0.77 - 0.92)				
Bias Factor B	19% (9% - 30%)				
Diffusion Tube Mean (µg/m^3)	31.0				
Mean CV (Precision)	4.9%				
Automatic Mean (µg/m^3)	26.0				
Data Capture	99%				
Adjusted Tube Mean (µg/m^3)	26 (24 - 29)				

Notes:

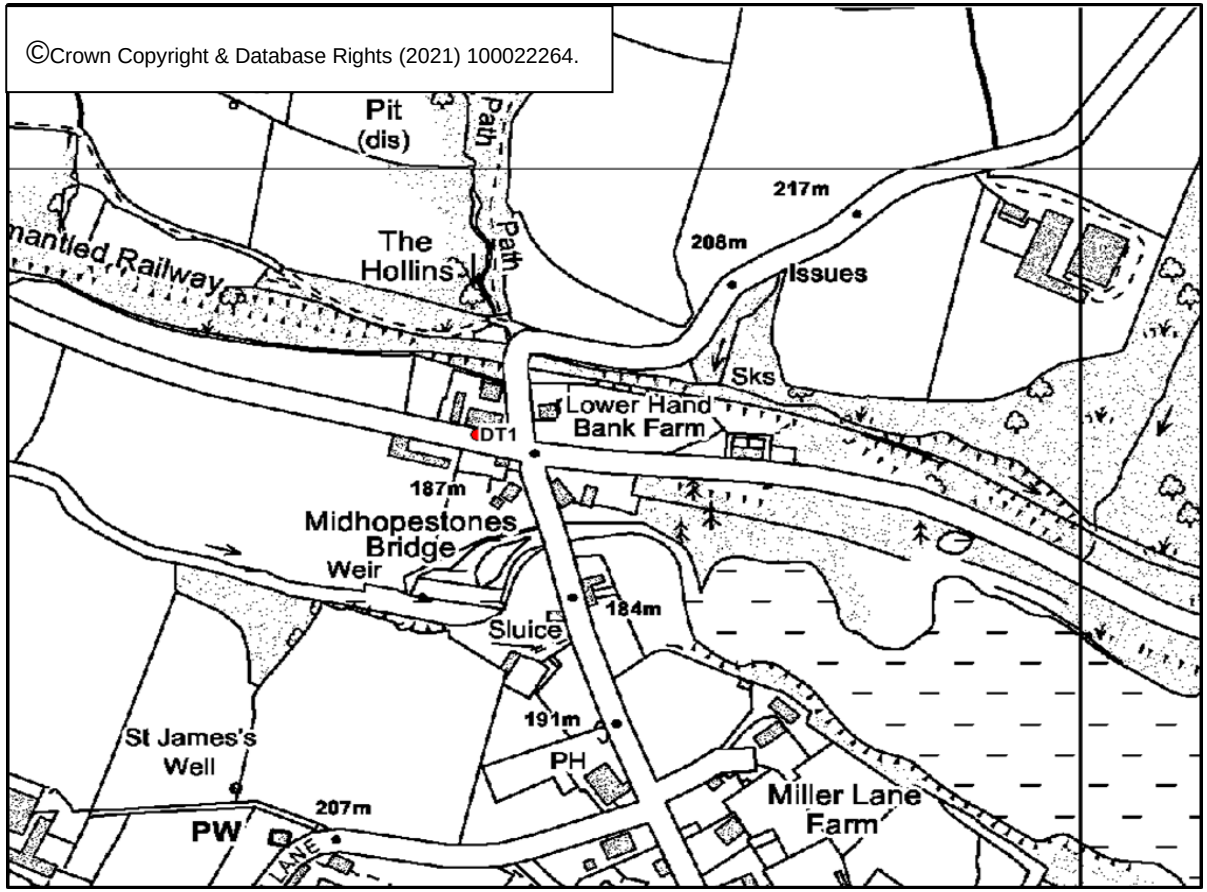
A single local bias adjustment factor has been used to bias adjust the 2020 diffusion tube results.

Table C.4 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

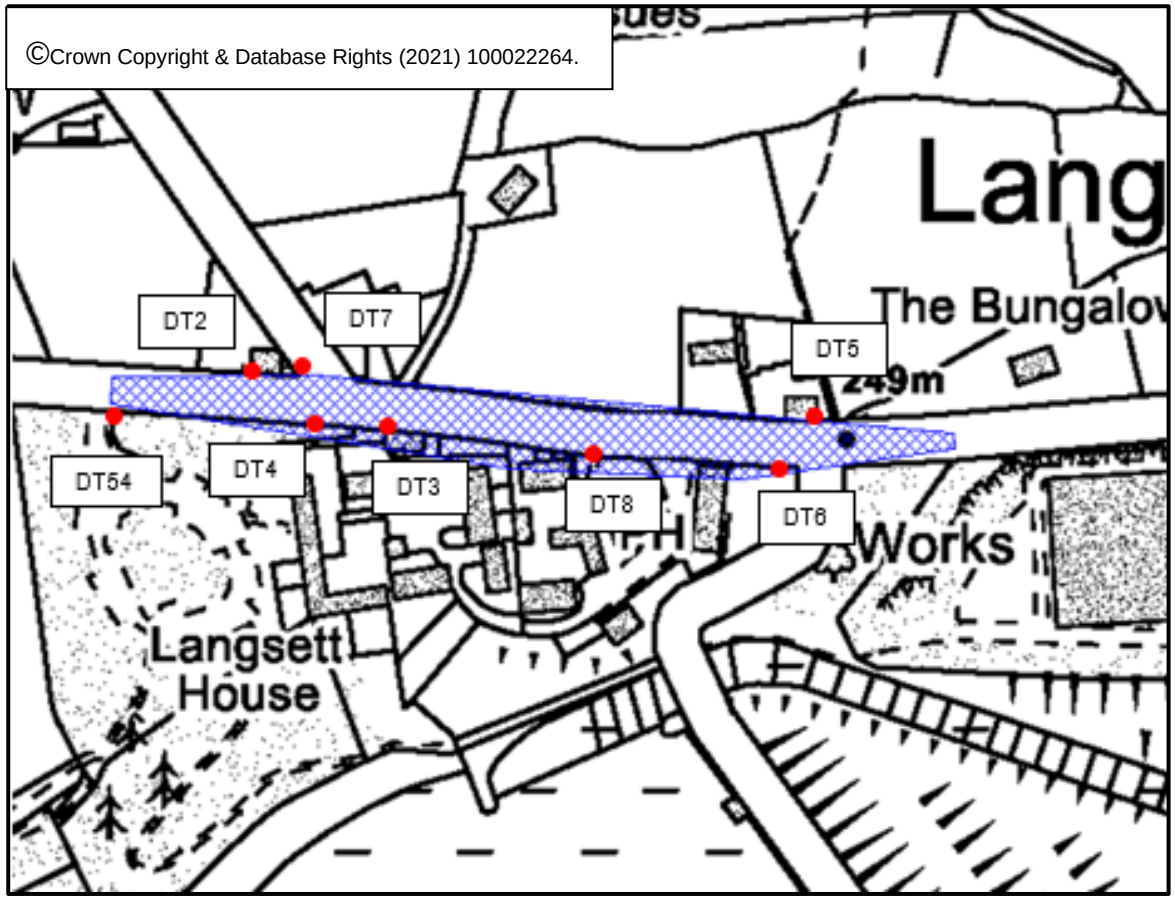
Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
DT8	2.0	4.0	36.2	12.0	32.3	Background NO_2 concentration obtained from Barnsley Gawber Urban Background AURN site – annual mean NO_2 concentration for 2020
DT41	2.0	10.0	42.4	12.0	31.0	Background NO_2 concentration obtained from Barnsley Gawber Urban Background AURN site – annual mean NO_2 concentration for 2020
DT43	2.0	7.0	41.4	12.0	32.8	Background NO_2 concentration obtained from Barnsley Gawber Urban Background AURN site – annual mean NO_2 concentration for 2020
DT53	0.3	2.8	38.6	12.0	28.5	Background NO_2 concentration obtained from Barnsley Gawber Urban Background AURN site – annual mean NO_2 concentration for 2020

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

Figure D.1 – Map of Non-Automatic Monitoring Site



DT 1, GR 423621 399817, westbound carriageway, A616, Midhopestones



DT 2, GR 421102 400496, eastbound (downhill) carriageway, A616, Langsett

DT 3, GR 421143 400481, westbound (uphill) carriageway, A616, Langsett

DT 4, GR 421126 400485, westbound (uphill) carriageway, A616, Langsett

DT 5, GR 421291 400482, eastbound (downhill) carriageway, A616, Langsett

DT 6, GR 421282 400471, westbound (uphill) carriageway, A616, Langsett

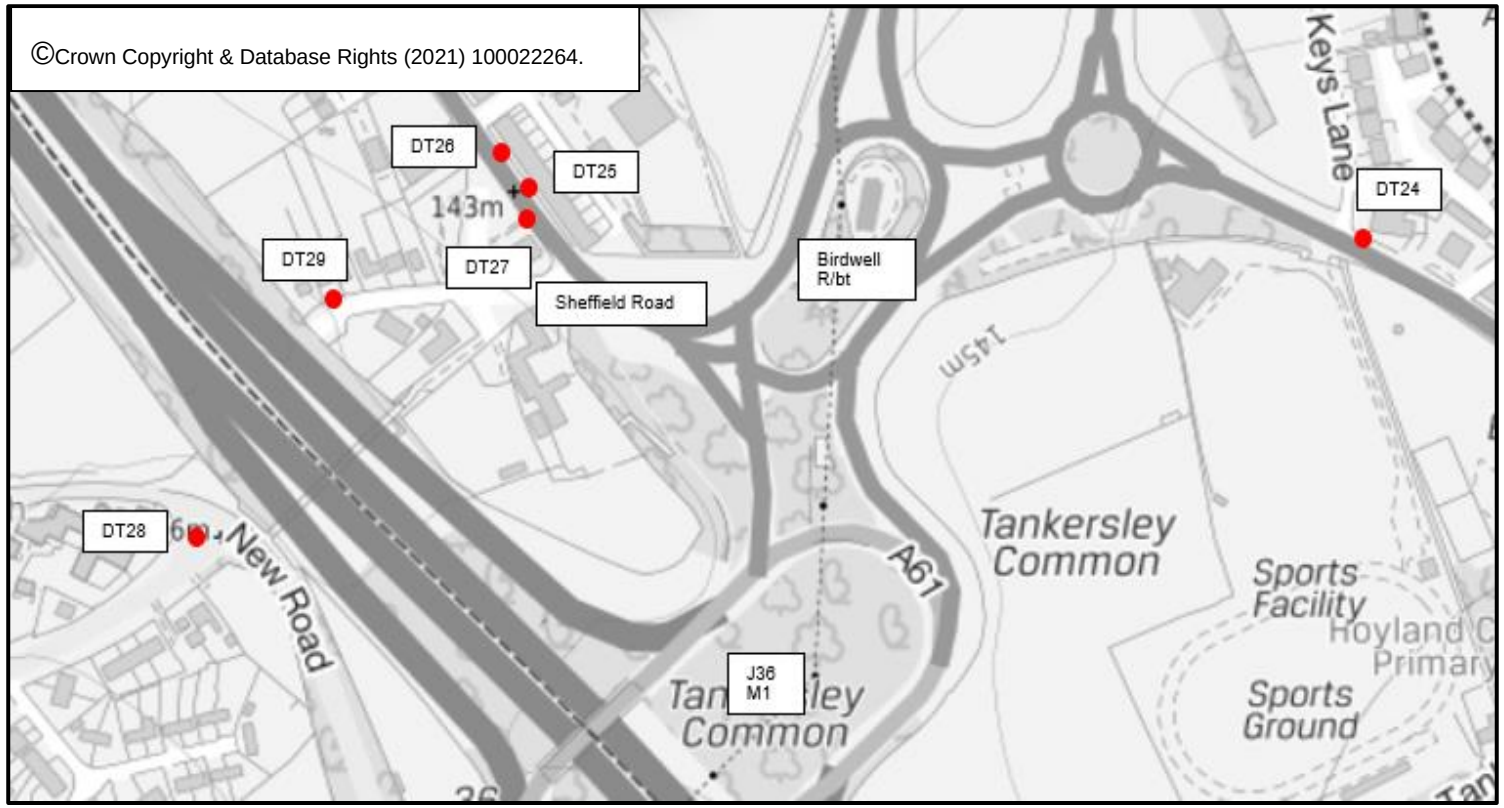
DT 7, GR 421117 400501, Gilbert Hill, (uphill) carriageway, junction with A616, Langsett

DT 8, GR 421215 400475, westbound (uphill) carriageway, A616, Langsett

DT 54 GR 421053 400489, westbound (uphill) carriageway

DT 56 GR 420982 400495, westbound (uphill) carriageway

Blue hatched area is AQMA 6



DT 24, GR 435274 400384, A6135, Hoyland

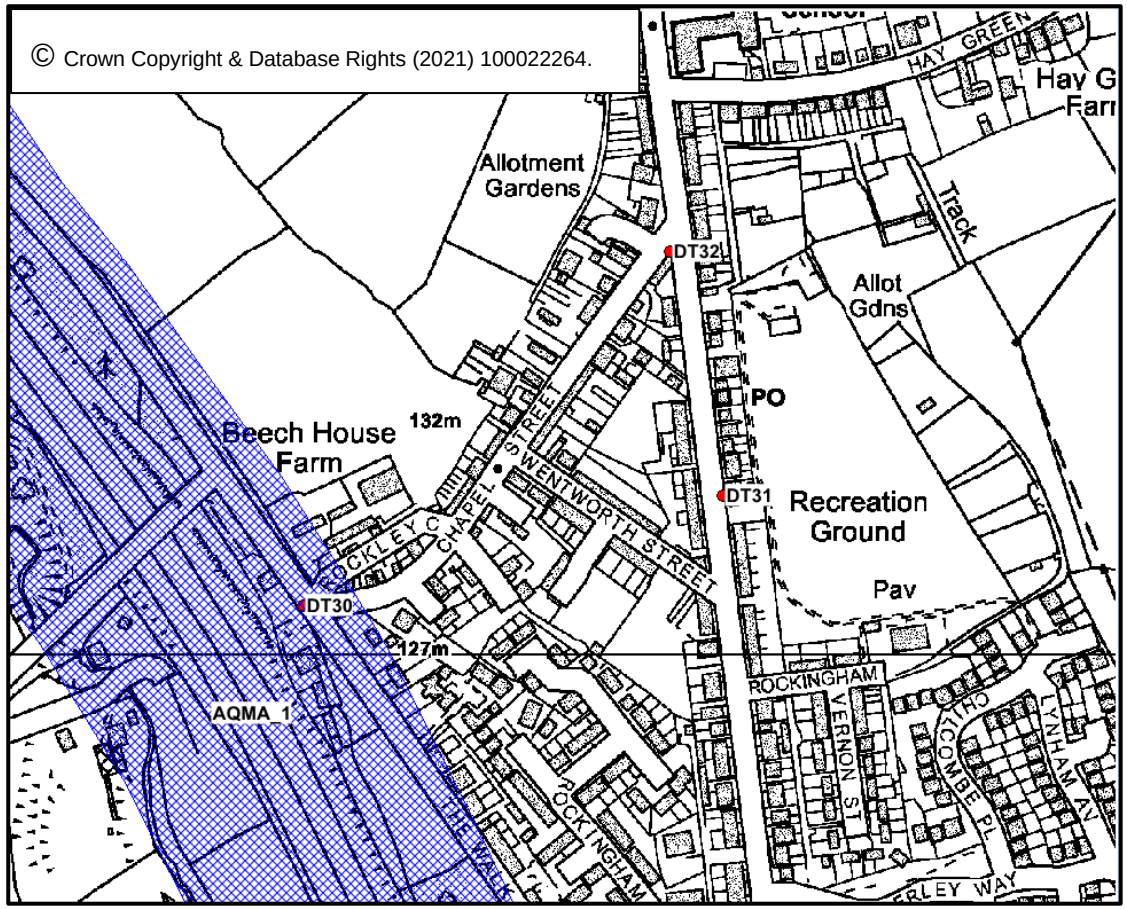
DT 25, GR 434832 400405, A61 Sheffield Road, Birdwell

DT 26, GR 434820 400421, A61 Sheffield Road, Birdwell

DT 27, GR 434823 400398, A61 Sheffield Road, Birdwell

DT 28, GR 434652 400231, adjacent school, Westwood New Road, Tankersley

DT 29, GR 434721 400352, Moor Lane, Birdwell

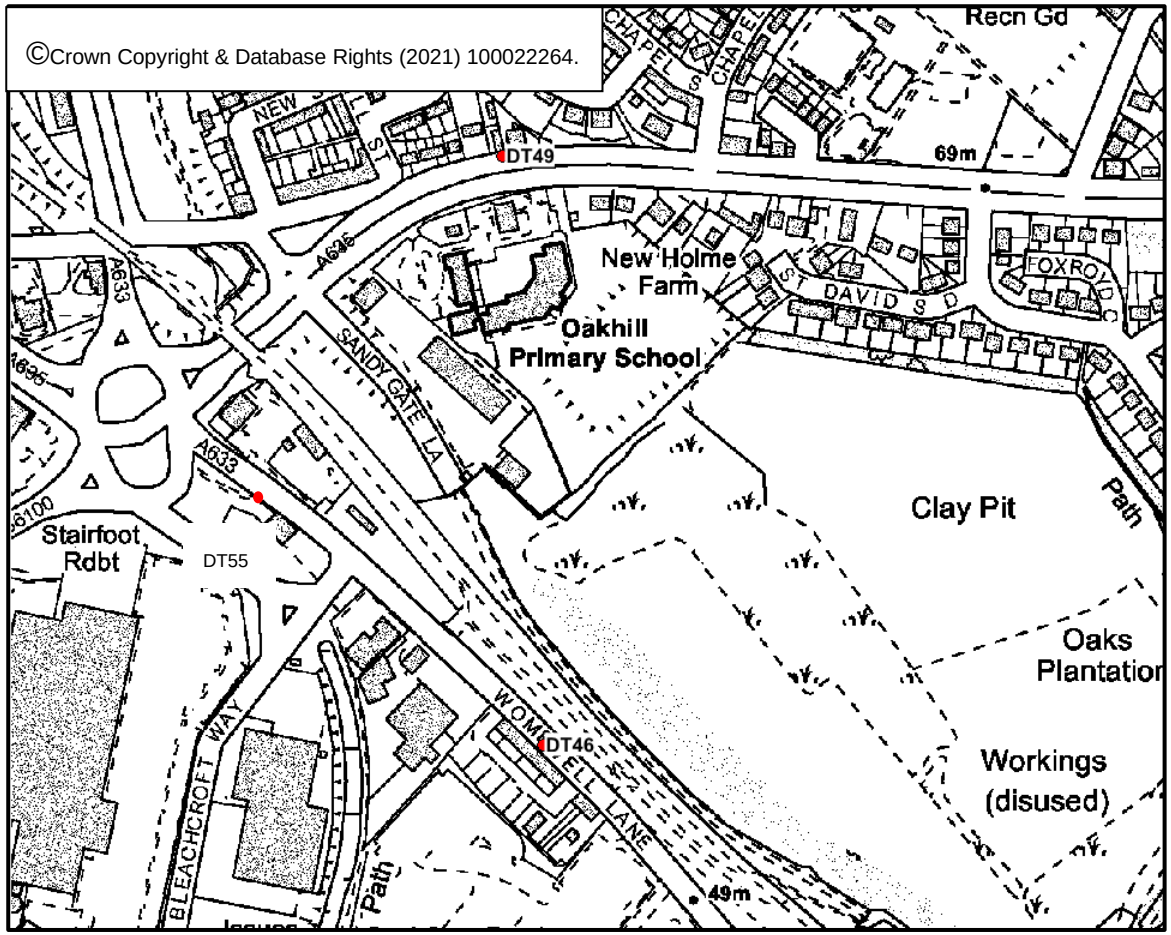


DT 30, GR 434309 401032, The Walk, Birdwell

DT 31, GR 434595 401107, southbound carriageway, A61 Sheffield Road, Birdwell

DT 32, GR 434559 401274, junction of northbound carriageway, A61 Sheffield Road, and Chapel Street, Birdwell

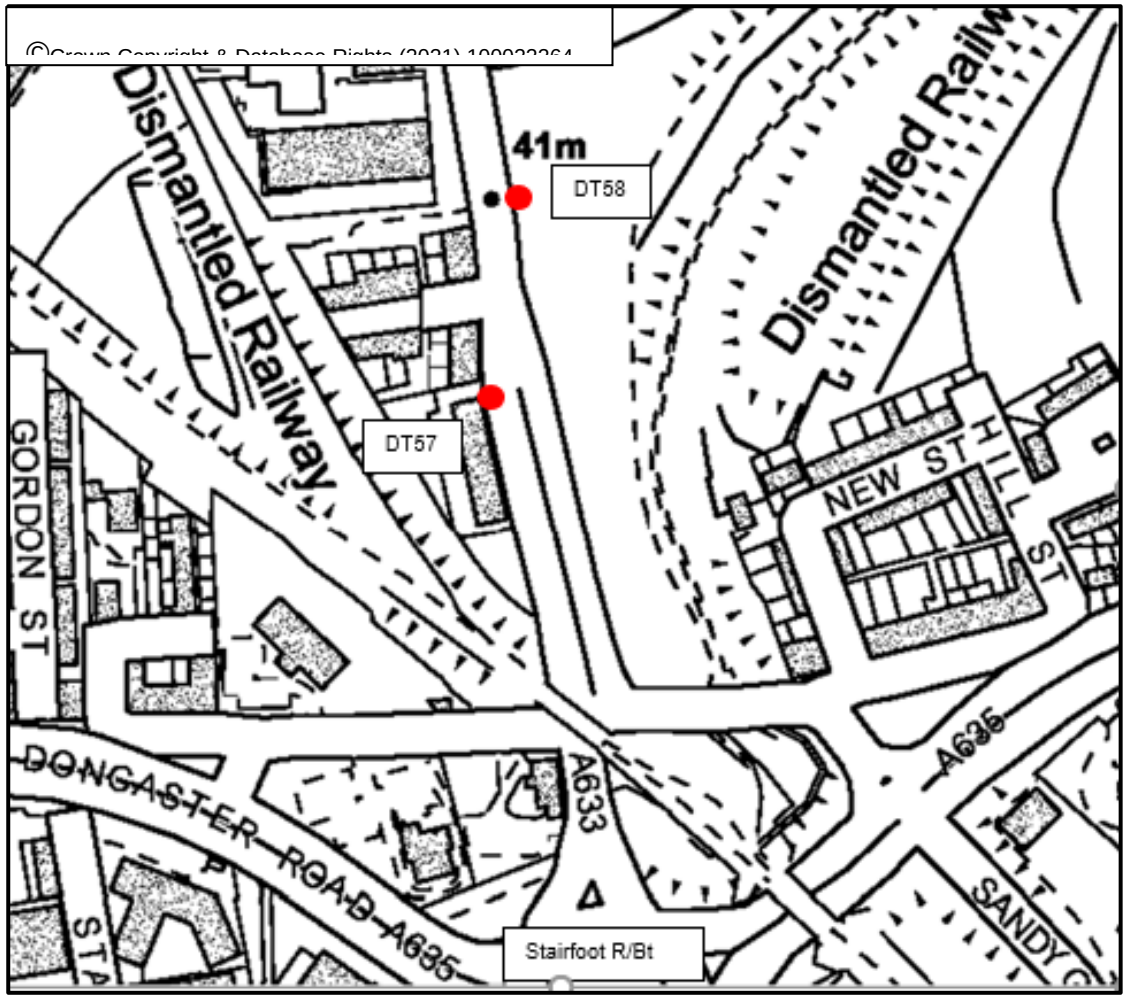
Blue hatched area is AQMA 1, 100 metres either side of the central reservation of the M1 motorway



DT 46, GR 437554 405291, near to Supermarket site, A633 Wombwell Lane, Stairfoot

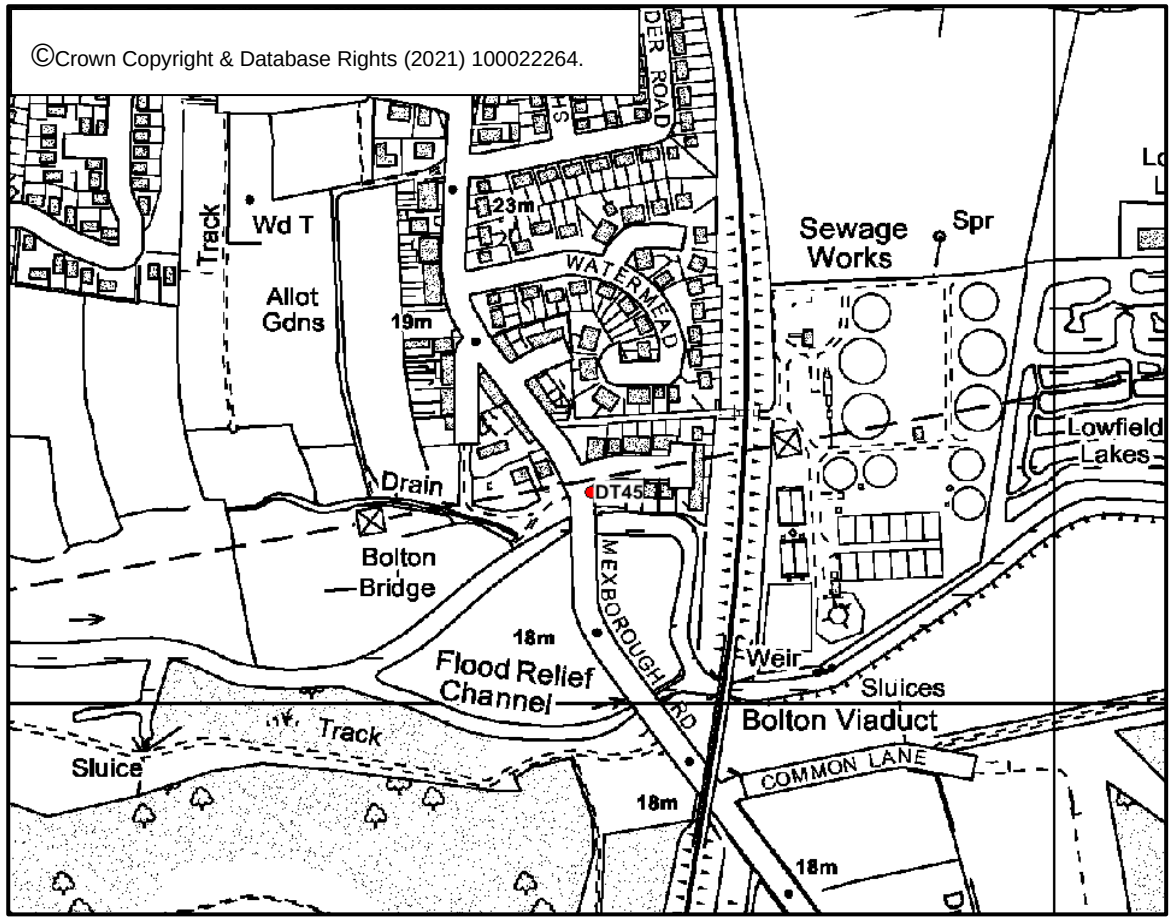
DT 49, GR 437528 405675, uphill gradient, A635 Doncaster Road, Ardsley

DT 55, GR 437369 405456, near to Stairfoot Roundabout, A633 Wombwell, Stairfoot

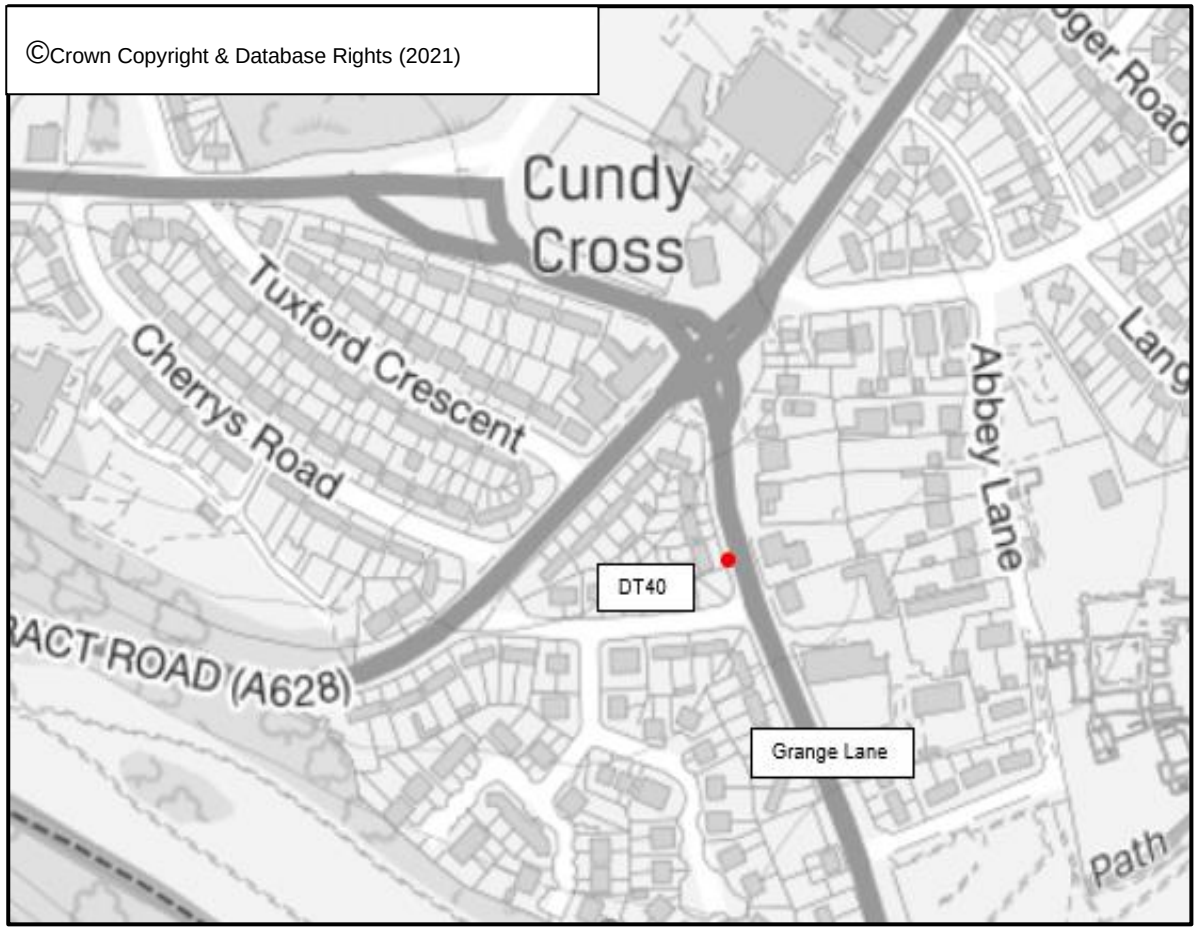


DT 57, GR 437242 405772, northbound carriageway, Grange Lane, Stairfoot,

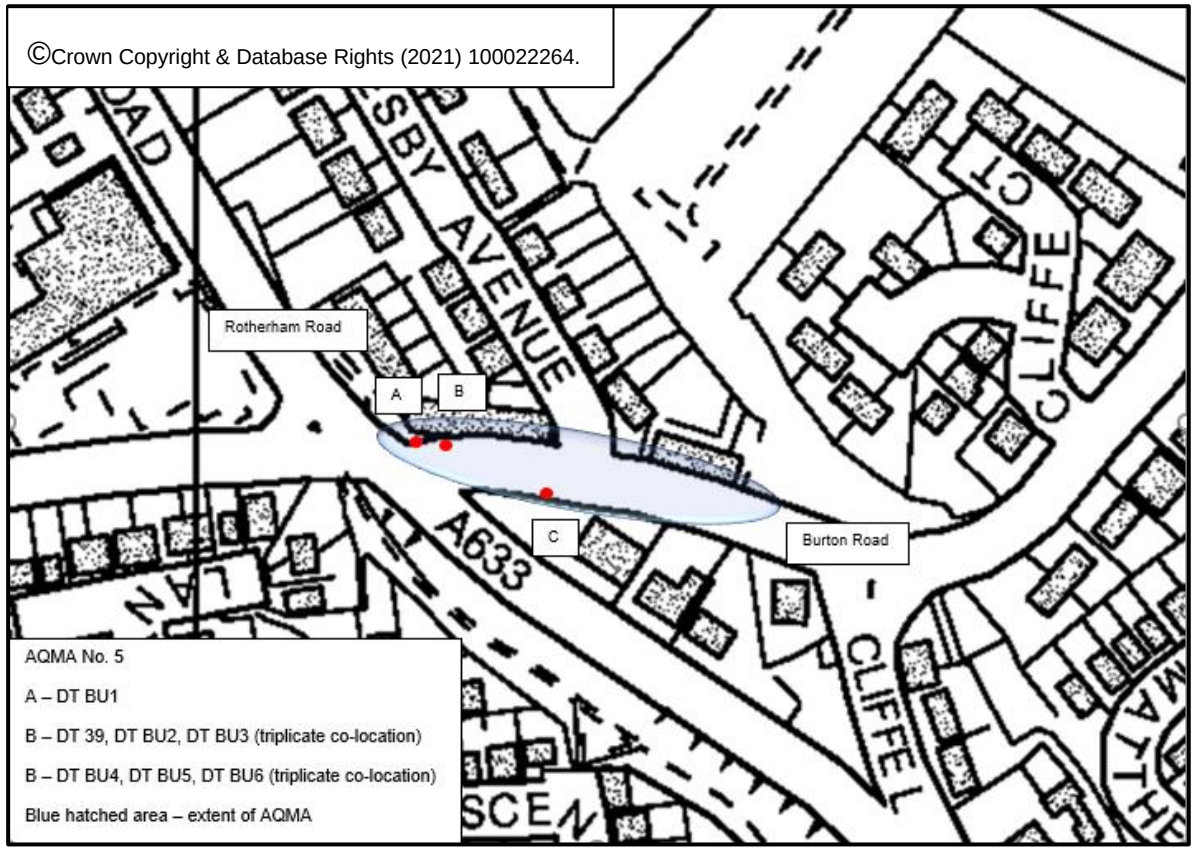
DT 58, GR 437250 405813, southbound carriageway, Grange Lane, Stairfoot,



DT 45, GR 445699 402140, Mexborough Road, Bolton-upon-Dearne



DT 40, GR 437122 406557, A633 Grange Lane, uphill carriageway near to Cundy Cross junction with Wakefield Road and Pontefract Road, Cundy Cross



DT 39, GR 436072 407320, uphill carriageway, Burton Road, adjacent to A633 Rotherham junction

BU 1, GR 436069 407321, uphill carriageway, Burton Road, adjacent to A633 Rotherham junction

BU 2, GR 436072 407320, uphill carriageway, Burton Road, adjacent to A633 Rotherham junction

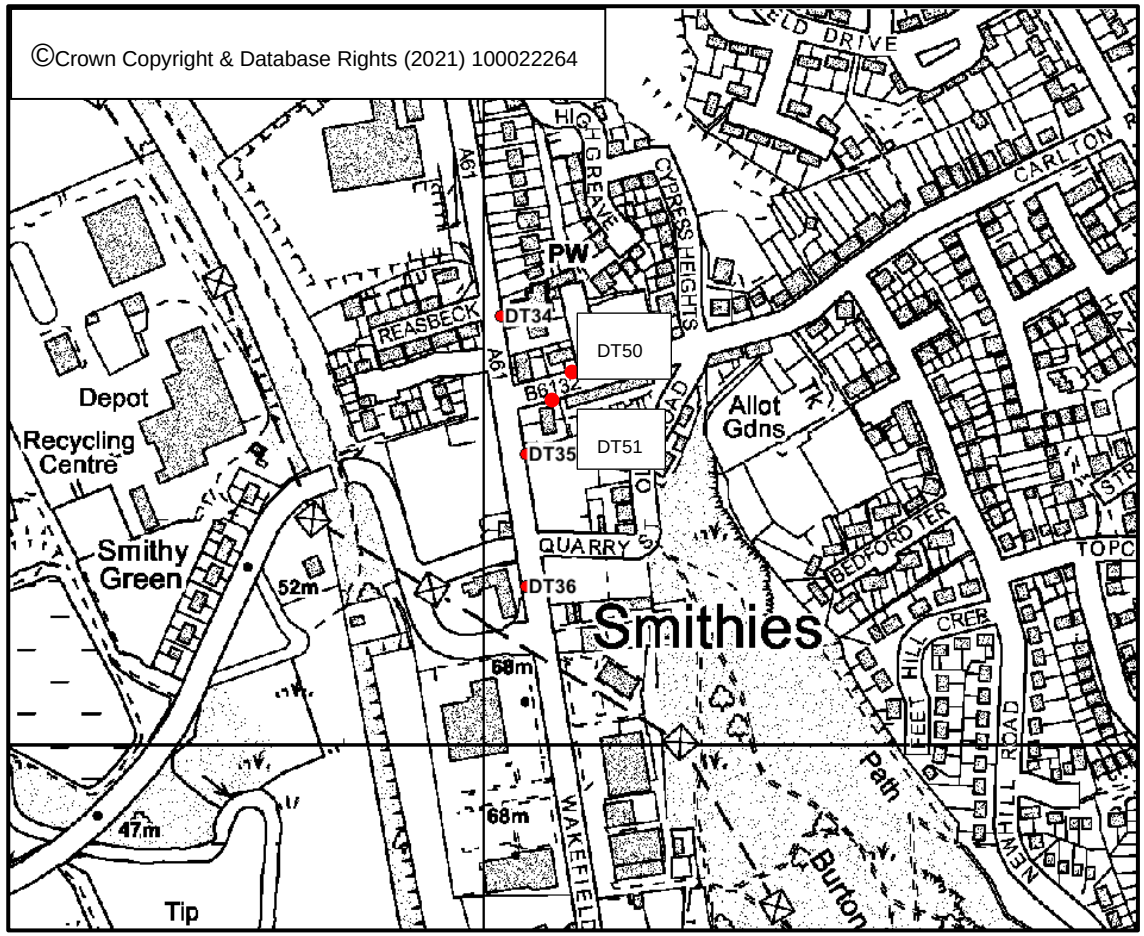
BU 3, GR 436072 407320, uphill carriageway, Burton Road, adjacent to A633 Rotherham junction

BU 4, GR 436107 407307, downhill carriageway, Burton Road, adjacent to A633 Rotherham junction

BU 5, GR 436107 407307, downhill carriageway, Burton Road, adjacent to A633 Rotherham junction

BU 6, GR 436107 407307, downhill carriageway, Burton Road, adjacent to A633 Rotherham junction

Blue hatched area is AQMA 5



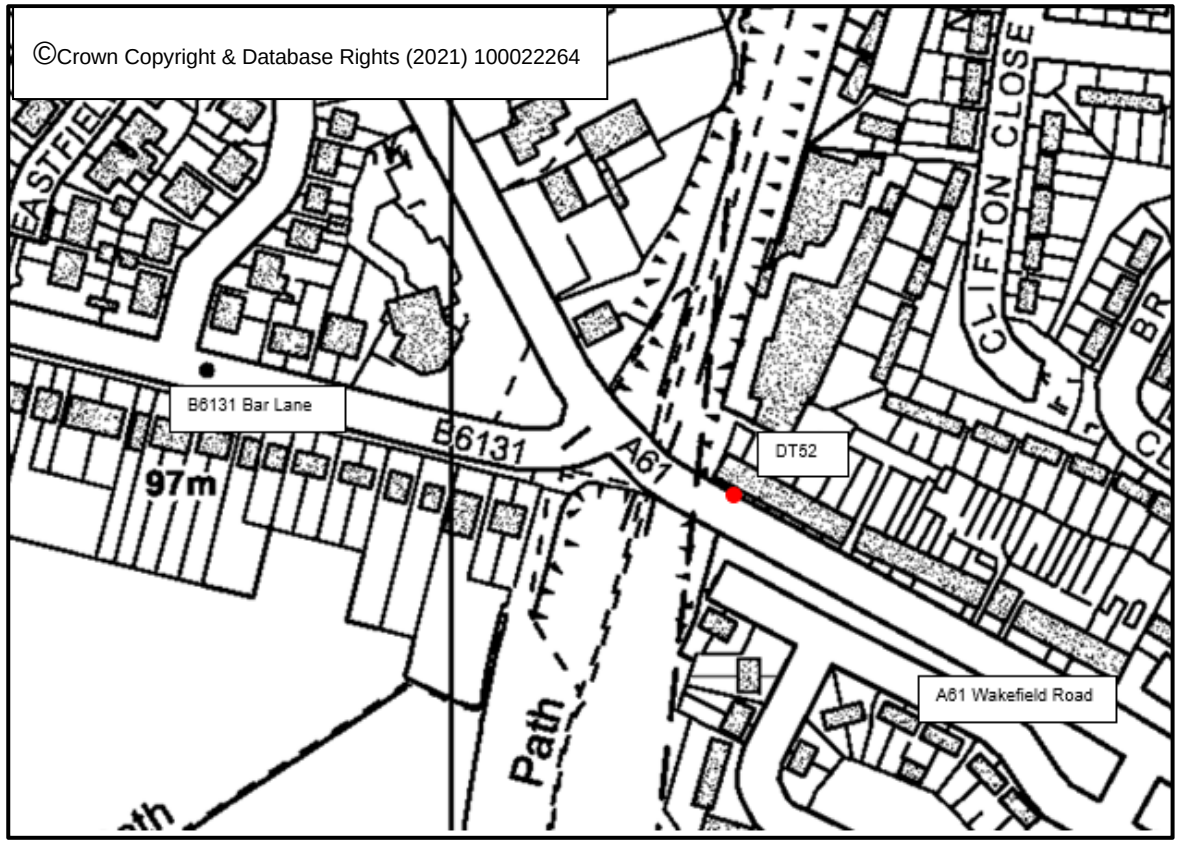
DT 34, GR 435011 408281, southbound carriageway, A61 Wakefield Road, Smithies

DT 35, GR 435027 408190, southbound carriageway, A61 Wakefield Road, Smithies

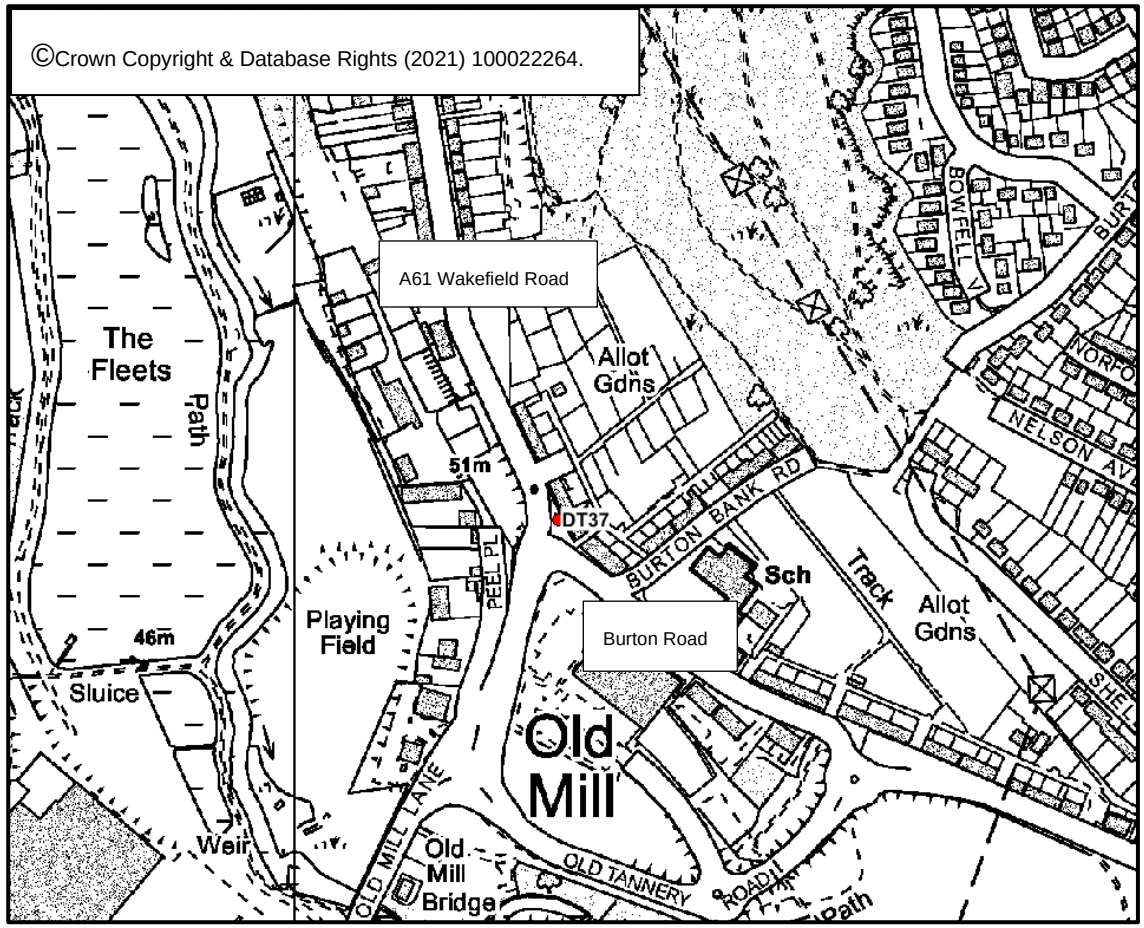
DT 36, GR 435027 408104, northbound carriageway, A61 Wakefield Road, Smithies

DT 50, GR 435062 408244, uphill carriageway, Carlton Road, junction with A61 Wakefield Road, Smithies

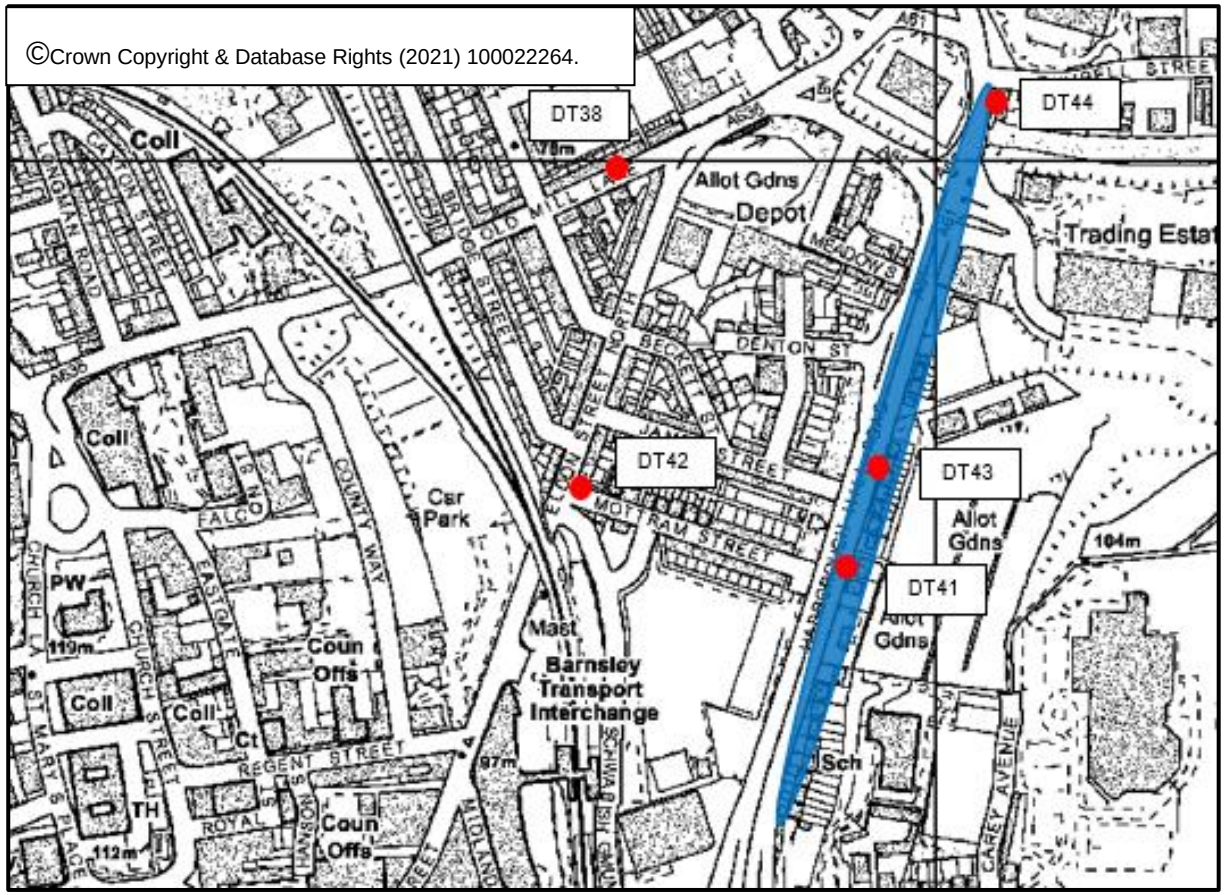
DT 51, GR 435049 408229, downhill carriageway, Carlton Road, junction with A61 Wakefield Road, Smithies



DT 52, GR 434112 409625, A61 Wakefield Road, junction with Bar Lane, Athersley North



DT 37, GR 435174 407499, A61 Wakefield Road, Old Mill, junction with Burton Road and A61 Old Mill Lane



DT 38, GR 434757 406995, Old Mill Lane, near to Harborough Hill gyratory

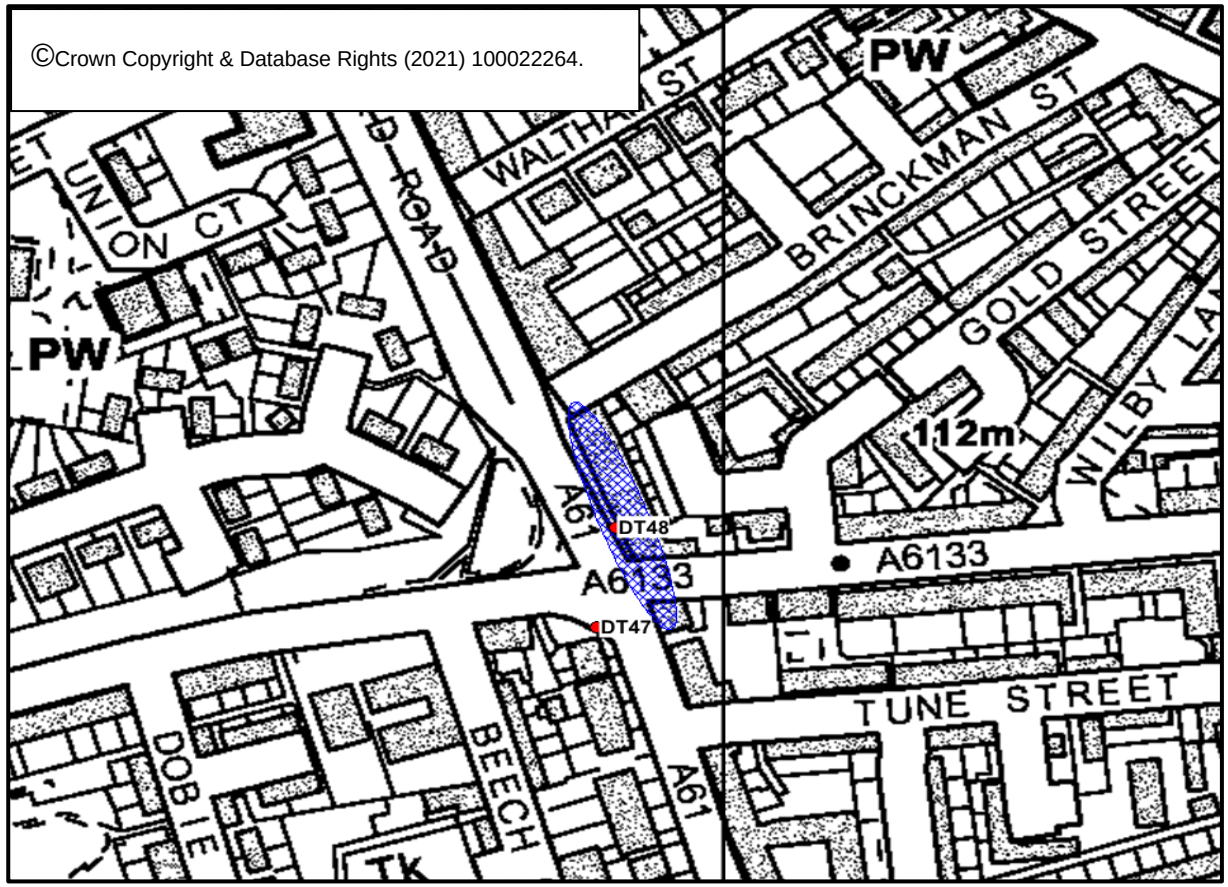
DT 41, GR 434933 406695, A61 Harborough Hill Road, uphill gradient

DT 42, GR 434727 406753, Junction Mottram Street and Eldon Street, near to Barnsley town centre bus and rail interchange

DT 43, GR 434955 406769, A61 Harborough Hill Road, uphill gradient

DT 44, GR 435047 407033, A61 Harborough Hill Road, uphill gradient, near to gyratory

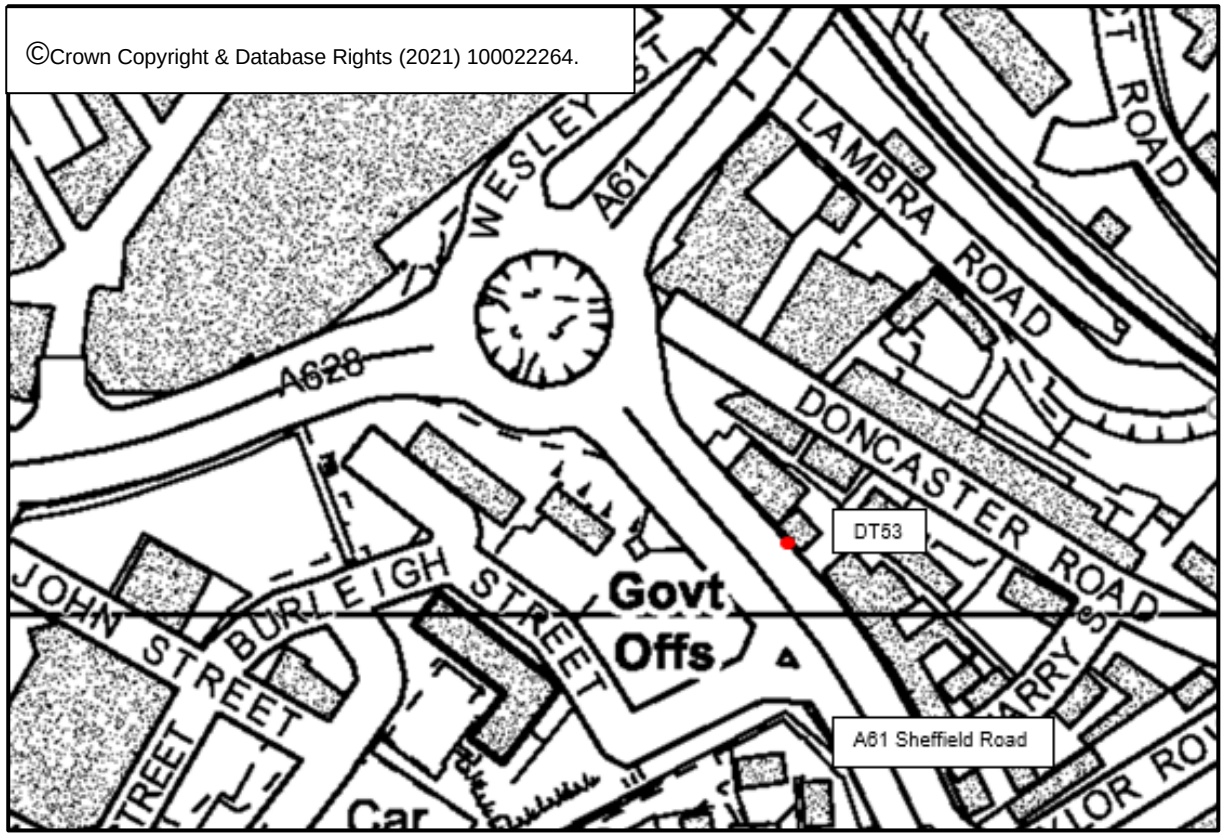
Blue hatched area is AQMA 4



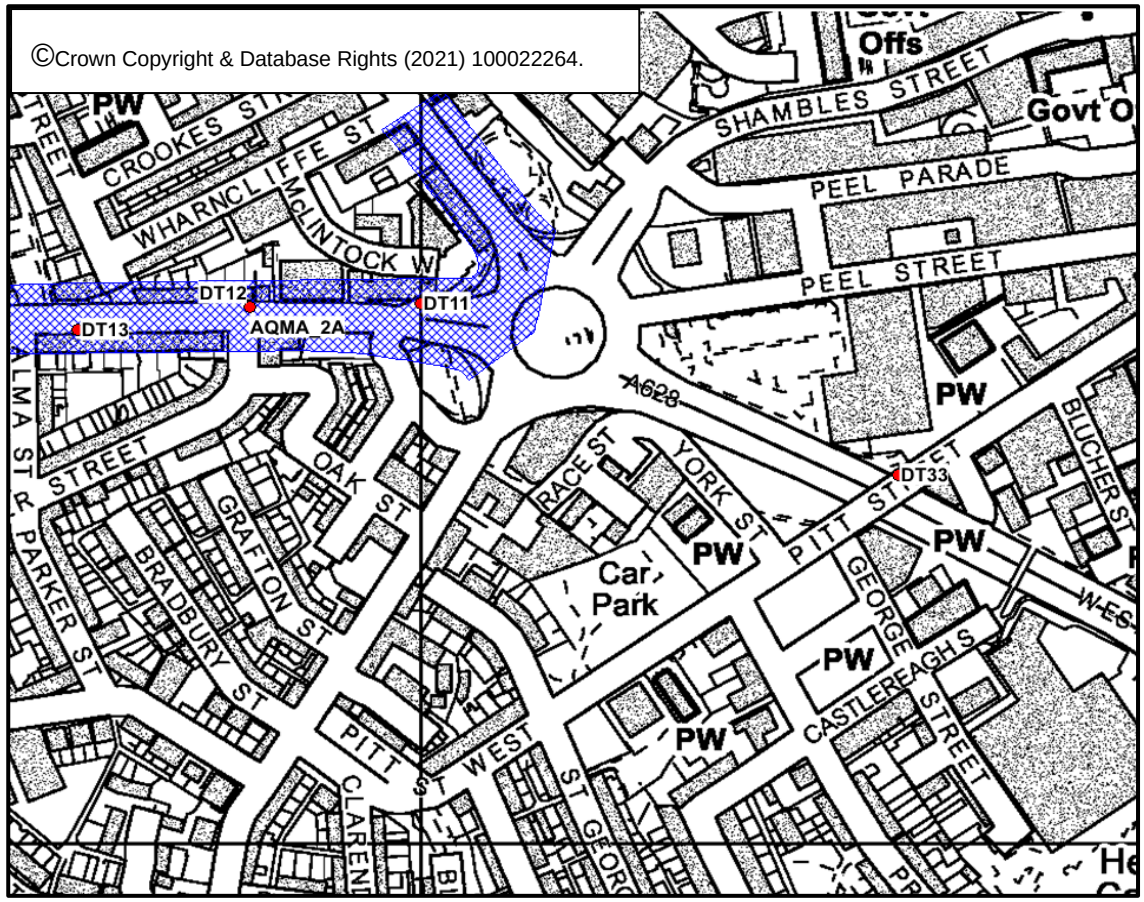
DT 47, GR 434958 405672, A61 Sheffield Road, junction with Park Road

DT 48, GR 434964 405709, A61 Sheffield Road, junction with A6133 Cemetery Road

Blue hatched area is AQMA7



DT 53, GR 434809 406023, A61 Sheffield Road, outbound from Barnsley town centre



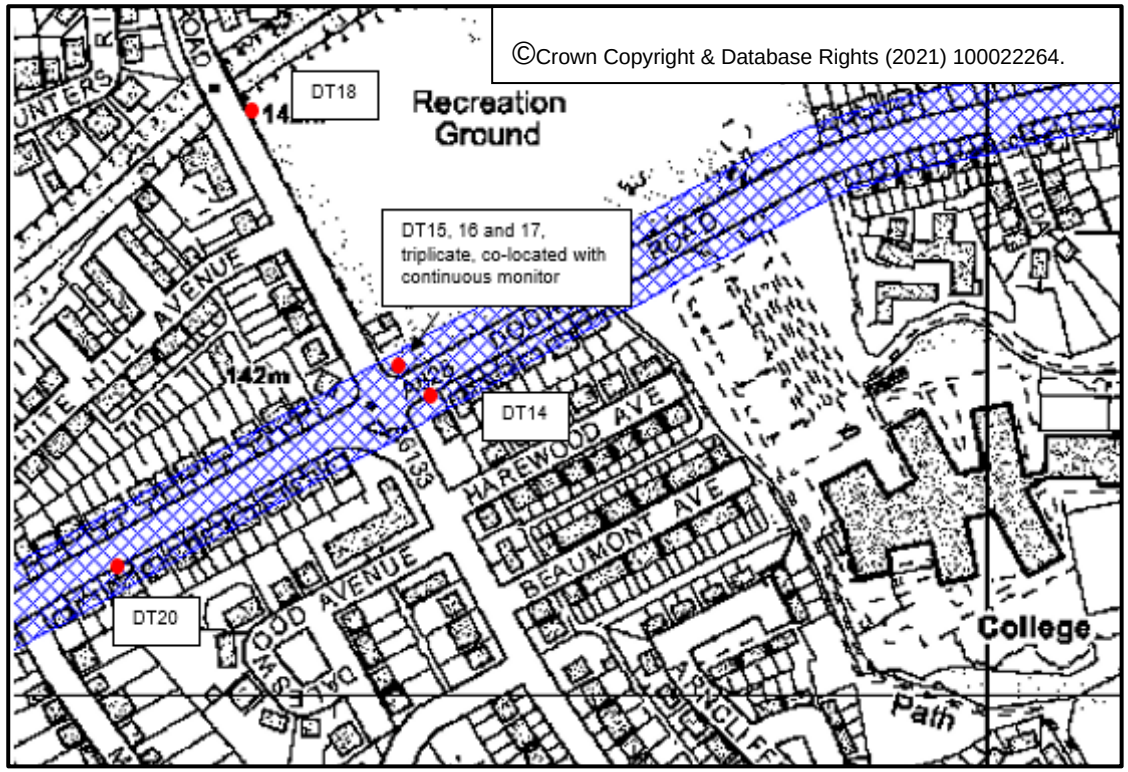
DT 11, GR 434000 406292, A628 Dodworth Road, near to Town End roundabout, eastbound carriageway

DT 12, GR 433910 406290, A628 Dodworth Road, near to Town End roundabout, eastbound carriageway

DT 13, GR 433820 406278, A628 Dodworth Road, near to Town End roundabout, westbound carriageway

DT 33, GR 434251 406199, Pitt Street, crossing A628 Westway

Blue hatched area is AQMA 2A



DT 14, GR 432702 406160, A628 Dodworth Road, near to Pogmoor Crossroads

DT 15, GR 432680 406174, A628 Dodworth Road, Pogmoor Crossroads, continuous monitor co-location site

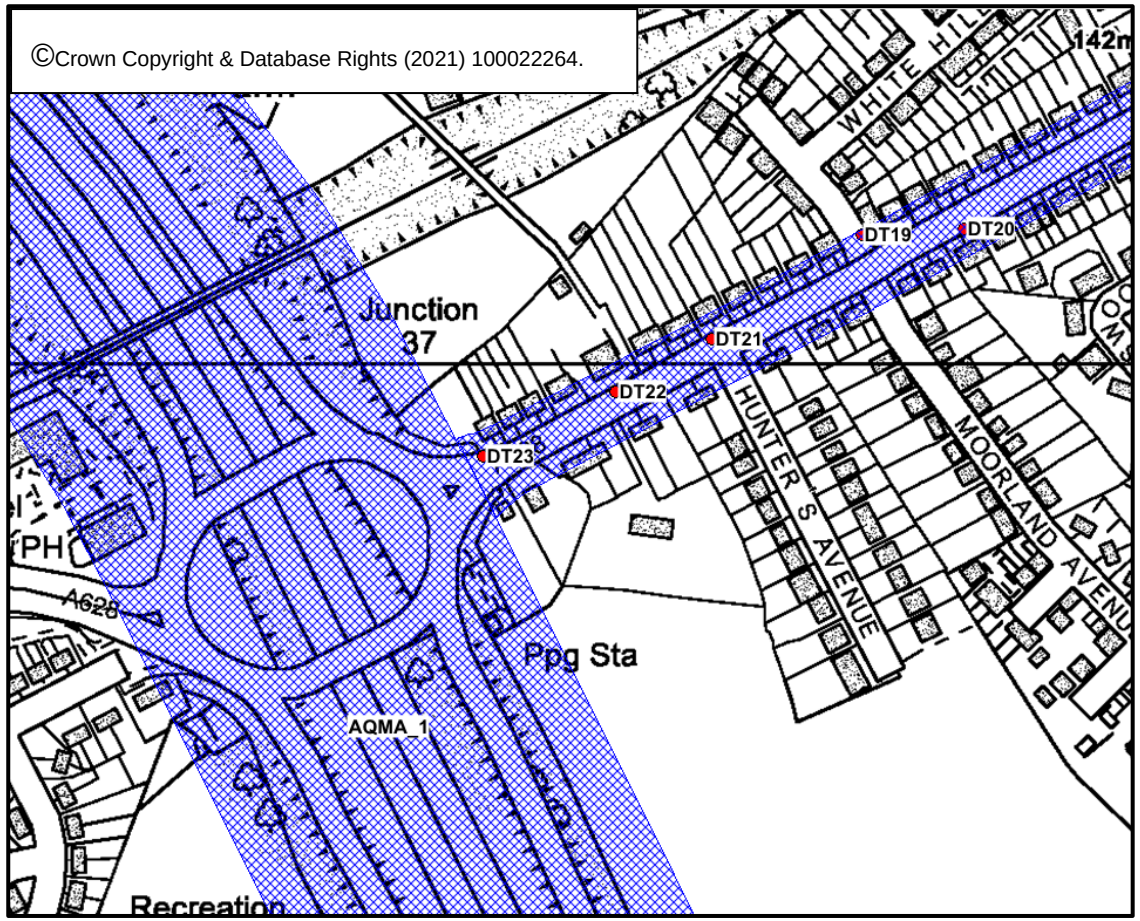
DT 16, GR 432680 406174, A628 Dodworth Road, Pogmoor Crossroads, continuous monitor co-location site

DT 17, GR 432680 406174, A628 Dodworth Road, Pogmoor Crossroads, continuous monitor co-location site

DT 18, GR 432603 406312, Pogmoor Road, near to bridge over railway line

DT 20, GR 432535 406071, A628 Dodworth Road, outbound carriageway from Barnsley town centre

Blue hatched area is AQMA 2A



DT 19, GR 432481 406068, Crown Hill Road, A628 Dodworth Road

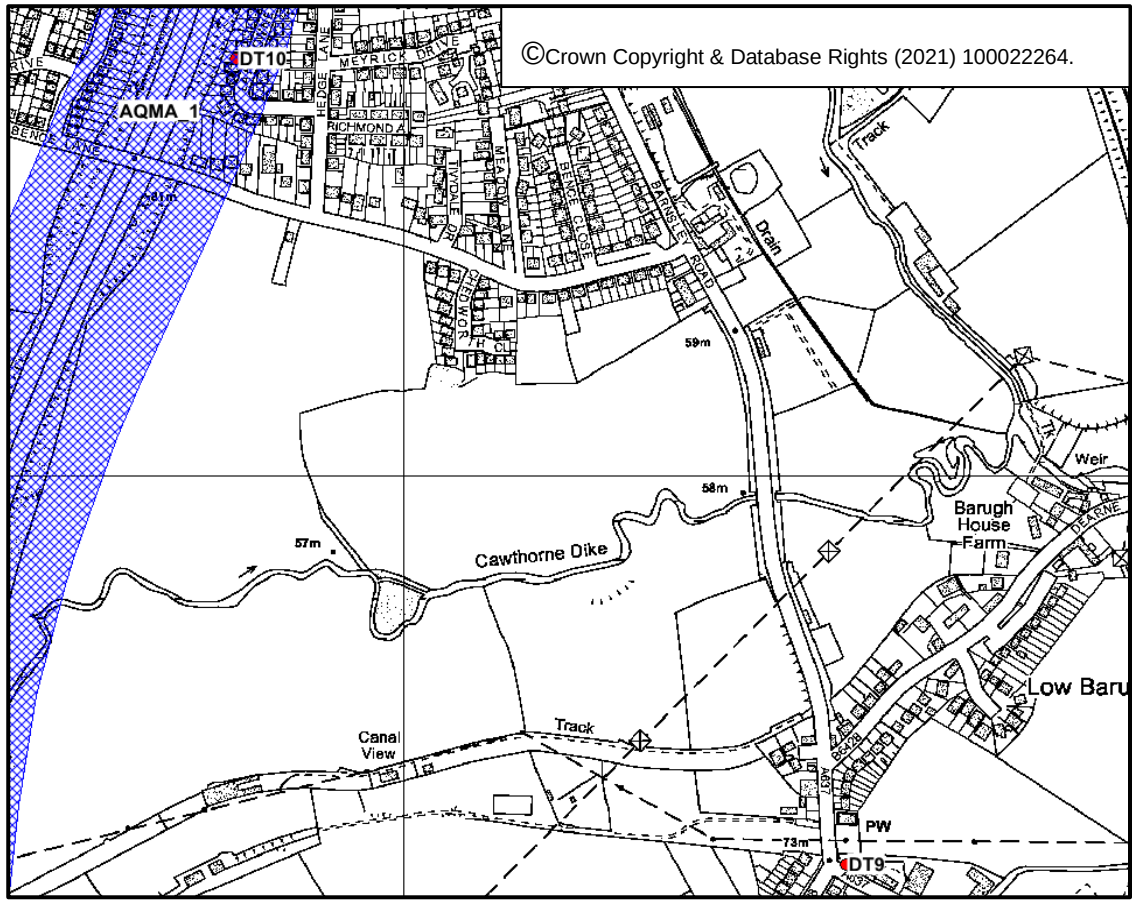
DT 20, GR 432535 406071, A628 Dodworth Road, outbound carriageway from Barnsley town centre

DT 21, GR 432402 406013, A628 Dodworth Road, inbound carriageway to Barnsley town centre, near to junction 37, M1 motorway

DT 22, GR 432351 405985, A628 Dodworth Road, inbound carriageway to Barnsley town centre, near to junction 37, M1 motorway

DT 23, GR 432281 405951, A628 Dodworth Road, inbound carriageway to Barnsley town centre, near to junction 37, M1 motorway

Blue hatched areas are AQMA 2A and AQMA 1



DT 9, GR 431468 408579, Roundabout, junction of A637 Claycliffe Road and Barugh Lane, Low Barugh

DT 10, GR 430820 409453, Lansdowne Crescent, Darton, adjacent to the M1 motorway.

Blue hatched area is AQMA 1

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[11]

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

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

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[12] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[13] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

[12] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

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

represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Barnsley

Reductions of NO_2 concentrations of between 25 and 40% were experienced at our continuous monitoring sites between April and May 2020. This equated to a 22% reduction in annual mean concentration relative to 2019 at our A628 Pogmoor roadside site and a 29% reduction in annual mean concentration relative to 2019 at the Barnsley Gawber urban background AURN site. In 2020, all monitoring sites complied with the annual mean objective (at receptor façade) within all our AQMAs. The reduction in NO_2 experienced within 2020 has allowed the Council to provide an evidence base in relation to the annual mean objective being achievable.

As with elsewhere in the UK, reductions of NO_2 concentrations were experienced at our monitoring sites within between April and June 2020.

In order to account for the confounding impact of the weather, a statistical model was developed to calculate the impact of the lockdowns on NO_2 concentrations (Carslow, University of York, March 2020, Analysis of the Covid 19 Lockdown on UK Local Air Pollution).

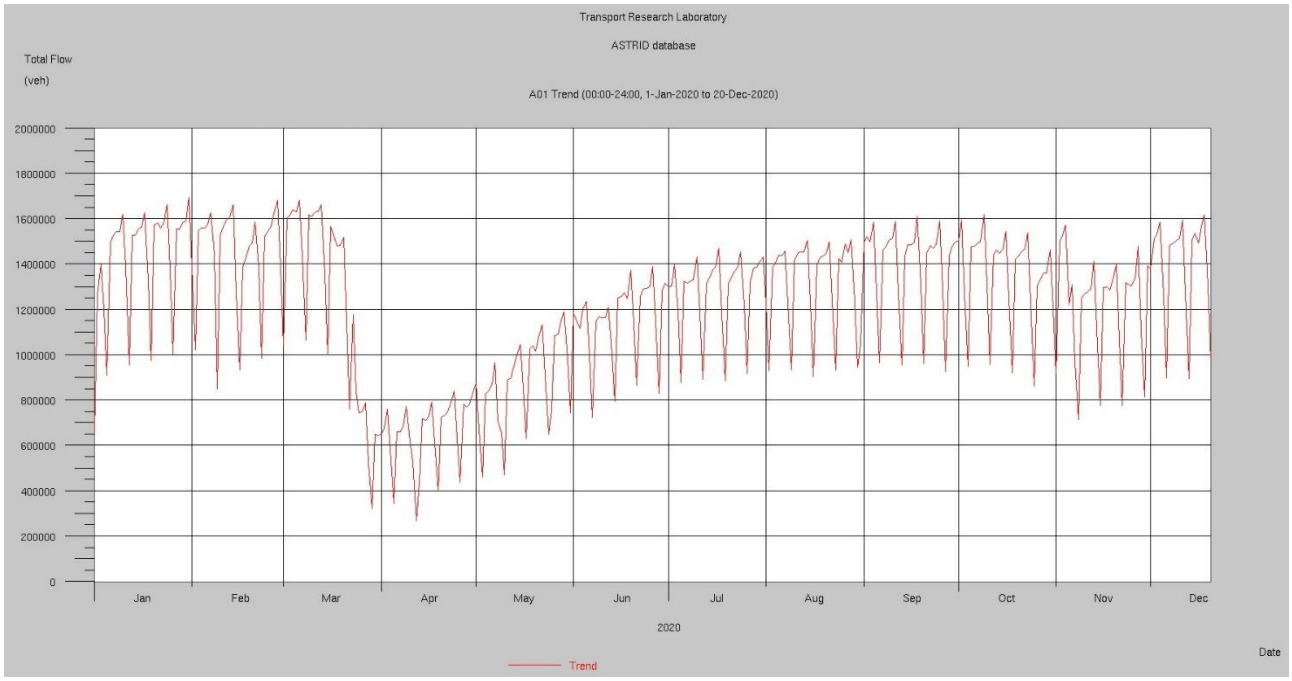
This statistical analysis was subsequently applied to the first lockdown in Barnsley comparing a “business as usual” expected NO_2 concentration and the actual monitored concentrations in lockdown for the period 23rd March 2020 (the start of lockdown) to 12th May 2020. This comparison indicated a welcome **37%** reduction in NO_2 concentrations at roadside and **29%** reduction at background within Barnsley. These reductions were broadly consistent with estimated reductions elsewhere in the country. Following this, a more detailed estimation of change in NO_2 concentrations has been undertaken

(https://www.airqualityengland.co.uk/assets/reports/19/Barnsley_report_covid_analysis.html).

There does not appear to be a reduction in PM_{10} concentrations at when comparing the annual averages for 2020 and 2019 from our A635 Kendray roadside site (19.6 µg/m^3 in 2020 compared to 19.8 µg/m^3 in 2019).

Barnsley MBC have total traffic flow trend data taken from the Councils' urban traffic control systems. Whilst these data are not a true reflection of exact vehicle numbers in the Borough, these data however a provide a good indication of change of traffic flows within the Borough before and during lockdown, and subsequent easing of restrictions. These data are detailed in Chart One below:

Chart One – Indicative local traffic flows from Barnsley MBC Urban Traffic Control Systems



Opportunities Presented by COVID-19 upon LAQM within Barnsley

During the first pandemic lockdown, the Council took the opportunity to explore the issues surrounding allocation of existing road space for active travel. Specifically, the Council provided cycling and walking space through Barnsley town centre on town centre roads from the Interchange towards the district hospital, using funding from the Department for Transport via the Sheffield City Region. Although this temporary road allocation was removed following the lifting of the first lockdown restrictions, the Council has gained experience from this pilot which is now intended to be used as the Council seeks to deliver a more permanent active travel road allocation elsewhere in the Borough, which hopes to connect a heritage centre (Elsecar Heritage Centre) with a well-used cycling and walking route the Trans-Pennine Trail.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Barnsley Council

In accordance with guidance presented within the LAQM Impact Matrix provided within Table F 1 we detail below the LAQM constraints and challenges which we have attributed to the pandemic.

- The implementation of action plan measure 2: Barnsley Bus Voluntary Agreement been delayed due to constraints imposed upon public transport during 2020. Public transport within our authority has seen reduced patronage. **Small Impact**
- As with previous years, a local bias adjustment factor has been utilised to adjust the diffusion tube results for 2020. Local 2020 diffusion tube data was affected by the non-compliance with the changeover dates recommended by the Diffusion Tube national monitoring calendar, and also rejection of some data. Although the Diffusion Tube Processing Tool calculated a factor of 0.84, this is in contrast to previous years' factors of between 0.94 and 1.03. There is therefore the potential for there to be a greater degree of uncertainty associated with the resultant annual mean NO_2 concentrations in 2020 than in previous years. **Large Impact**
- During 2020, access to a number one diffusion tube monitoring sites was restricted due to its locations on a residential building (Diffusion Tube 10). Therefore, it was not possible to maintain diffusion tube exposure periods for April to December 2020. This has affected data capture within 2020, resulting in monitoring sites having to be annualised. **Small Impact**

The impacts as presented above are therefore aligned with the criteria as defined in Table F 1, with professional judgement considered as part of their application.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

Category	Impact Rating:
Automatic Monitoring – Data Capture (%)	None
Automatic Monitoring – QA/QC Regime	None
Passive Monitoring – Data Capture (%)	Small
Passive Monitoring – Bias Adjustment Factor	Large
Passive Monitoring – Adherence to Changeover Dates	Small
Passive Monitoring – Storage of Tubes	Small
AQAP – Measure Implementation	Small
AQAP – New AQAP Development	None

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
BAM	Beta Attenuation Monitor (analyser for measuring PM_{10} concentrations)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
ECO Stars	ECO (**E**fficient **C**leaner **O**peration) Fleet Recognition Scheme
EU	European Union
LAQM	Local Air Quality Management
MOVA	Microprocessor Optimised Vehicle Actuation - traffic control system, with the aim of maximising efficient traffic flow at a junction
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

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