Lichfield District Council

2019 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the
Environment Act 1995
Local Air Quality Management

June 2019

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Report Reference number	ASR2019
Date	June 2019

Annual Status Report (ASR) Air Quality - Endorsement from the Director of Health and Care, Staffordshire County Council

Staffordshire County Council is committed to working with partners to ensure that Staffordshire will be a place where improved health and wellbeing is experienced by all. Poor air quality has a negative impact on public health, with potentially serious consequences for individuals, families and communities. Identifying problem areas and ensuring that actions are taken to improve air quality forms an important element in protecting the health and wellbeing of Staffordshire residents. Improving air quality is often a complex issue, presenting a multi-agency challenge – so it is essential that all agencies work together effectively to deliver improvements where they are needed. As Director of Health and Care across Staffordshire I endorse this Annual Status Report which sets out the position in all the Local Authorities across Staffordshire and Stoke-on-Trent

I'm pleased to report that we have developed an ongoing work programme to address air quality issues in Staffordshire and Stoke-on-Trent through the Defra Funded Air Quality Project. In addition Officers from Newcastle Borough Council, Stoke City Council and Staffordshire County Council are jointly working under Ministerial Direction to improve transport related air pollution in North Staffordshire.

Dr. Richard Harling

Director of Health and Care
Staffordshire County Council
13 June 2019

Executive Summary: Air Quality in Our Area

Air Quality in Lichfield District

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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2]. The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Lichfield District Council (LDC) is situated in the north of the West Midlands, close to some highly industrialised parts of the UK. To the south west lies Walsall and Birmingham. LDC is only moderately industrialised, but there are a number of major roads in the region, including the M6 Toll, A38 and A5. Consequently, road traffic is the main source of air pollution in the area. Burntwood and Lichfield are the two largest urban areas in the District.

LDC has two Air Quality Management Areas (AQMAs) that were declared due to exceedances of the annual mean nitrogen dioxide (NO_2) objective. Both are associated with emissions from road traffic. These can be seen at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=147. A map of both AQMAs has been included in Appendix D.

AQMA no.1 was declared in August 2008 and encompasses the traffic dense area of the A5 Muckley Corner Roundabout, together with fourteen sensitive receptors (mainly residential dwellings) around this junction.

During 2015, a Detailed Assessment was carried out on the A38. Modelling identified exceedances of the annual mean NO_2 objective at six isolated locations of relevant exposure covering a stretch of the A38 from the junction with the A5127 Burton Road to the northern boundary of the district. LDC therefore declared AQMA No.2 which came into force in August 2016.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Sites A38-2A/B, which previously exceeded the annual mean NO_2 objective and which is located within AQMA No.2 dropped just below 40µg/m^3 for the first time during 2017 and remained under the objective during 2018 with reported concentrations of 37µg/m^3 and 38.3µg/m^3 respectively for both years.

Meanwhile, MUC-1A/B/C and MUC-1 located within AQMA No.1 continued to exceed the annual mean objective during 2018, with reported concentrations of 41.4µg/m^3 and 43µg/m^3 respectively. Monitoring sites A38-2A/B, MUC-1A/B/C and MUC-1 were at locations representing relevant exposure and therefore distance correction was not required.

Annual mean NO_2 concentrations at exceeding sites, MUC-3 and MUC-5, also located within AQMA No.1 and site A38-4A/B located outside of the AQMAs were all distance corrected to estimate the concentration at relevant exposure. Of the sites that were distance corrected; only MUC-3 was still found to be exceeding the annual mean NO_2 objective at the receptor façade, with a reported concentration of 44.9µg/m^3.

While there were no new major air pollution sources identified during 2018 within the Lichfield District, the Council continues to work closely with partners and key stakeholders.

The District continues to attract new commercial and residential developments that incrementally increases emissions from activities such as vehicle usage. LDC's Environmental Protection Team therefore has a close working relationship with the Planning Department to ensure applications for new developments protect air quality and human health in accordance with the National Planning Policy Framework (2019) and associated Technical Guidance. Environmental Protection has been a key consultee on the Local Plan, which contains a spatial strategy that sets out the overall approach towards provision for new homes, jobs, and infrastructure and community facilities up to 2029. The spatial strategy seeks to concentrate major growth within urban areas alongside improvements to existing key services, facilities and infrastructure. This will contribute to reducing the need to travel, but also provide better opportunities for travel by public transport. Through the development of the employment locations it seeks to provide more local jobs and a wider variety of better paid local jobs to reduce out commuting levels.

LDC is also member of the Staffordshire Air Quality Forum ('SAQF'), which has encouraged partnership working on local air quality management, which is important given the cross boundary nature of air pollution. The SAQF comprises of local authority air quality officers, Staffordshire County Council Highways officers, Highways England (HE) staff, County Public Health and Public Health England staff as necessary. The SAQF group also feeds back to the Central England Environmental Health Chief Officers and engages with other groups such as the Midland Joint Advisory Council. The main joint projects within the SAQF are:

- The Eco-Stars Fleet Recognition Scheme project comprising of all eight Staffordshire and Stoke authorities. Funds for this scheme ended in 2018. More details are provided in Section 2.2
- The SAQF group have also collaborated with local Public Health Departments to review and assess $PM_{2.5}$ (fine particulate matter) levels in their ASRs (see Section 2.3).
- Following on from the Government's new Clean Air Strategy, Staffordshire County Council's Director of Public Health presented a report to the Staffordshire Health & Wellbeing Board (HAWB), highlighting the air quality situation across the whole of Staffordshire and activities identified as potentially making a positive contribution to air quality. From this a plan of action was produced for partnership working. The SAQF group has subsequently worked with Staffordshire County Council and successfully secured a Defra funded bid to deliver business/ school travel plans and provide electric vehicle (EV) charging point infrastructure across the Staffordshire authorities from July 2018 to July 2020. This project is predominantly focussing on areas affected by roads under Staffordshire County Highways jurisdiction. LDC is liaising with the County Council to see if any elements of the project could also benefit the two AQMAs in the Lichfield District.
- Work on a joint Supplementary Planning Guidance for Planners and Consultants is already underway and is included as a measure in LDC's second draft of the Air Quality Action Plan (AQAP). More details are provided in Section 2.2.
- Finally, LDC like all other Staffordshire authorities benefits from having an Integrated Transport Strategy (ITS) specific to the District. The measures in the ITS are aimed at transport measures under the County Council's jurisdiction, which for the Lichfield District are outside of the two AQMAs and currently are not included in the Draft Action Plan as they are unlikely to significantly benefit the two AQMAs. The ITS measures will nevertheless provide some benefit in easing congestion and improving public transport connectivity to the main

settlements in the District and therefore will help maintain concentrations of air pollutants below the objectives outside of the AQMAs. A summary of ITS measures already completed and planned for the coming reporting year are outlined in Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

The key major development within the Lichfield District is the High Speed Two project. Both Phase One and Phase 2a of HS_2 will pass through the Lichfield District. Civil works for Phase One are due to commence during summer 2019, whereas consultations for Phase 2a are ongoing. At this stage it is considered unlikely that HS_2 will have any significant adverse air quality impacts, however LDC will continue to liaise with HS_2, their contractors and other affected authorities throughout the process. A summary of HS_2 to date is presented in Appendix C.

Actions to Improve Air Quality

The key action taken by LDC over the last two years has been the Air Quality Action Plan (AQAP) applicable to both AQMAs. Source apportionment highlighted that for AQMA No.1 at Muckley Corner, 41.8% of NO_2 concentrations were attributable to road traffic, and in AQMA No.2 for the A38 the figures were even higher at 56.7%. In the case of the Muckley Corner AQMA, source apportionment also showed that a disproportionate amount of road traffic was attributable to HGVs at 20.2% of overall NO_2 across all modelled locations. The focus of proposed AQAP measures were then divided into five targeted categories;

1) Transport measures;
2) Leading by example measures;
3) Education, community and partnership measures;
4) Statutory measures; and
5) Air quality monitoring

The first draft of the AQAP went out for consultation in 2017/18 to LDC Councillors and officers, residents/businesses within or close to the AQMAs, Staffordshire County Council Highways, neighbouring local authorities, Highways England (HE), the M6 Toll operators (Midland Expressways Ltd) and Defra who approved the first Draft.

Following consideration of the comments from the first draft of the AQAP and in particular the responses from HE and proposals from Midlands Connects (a collaboration of local authorities including Staffordshire County Council, Local Enterprise Partnerships and other key partners from across the Midlands) the AQAP was amended. The second draft of the AQAP went out for full public consultation on the **24th June 2019** for a period of six weeks.

As the roads within both AQMAs are strategic roads that are under the jurisdiction of HE, LDC has no direct control over any intervention measures and is therefore heavily reliant on HE and other relevant bodies such as Midlands Connect to implement the proposed measures within the Action Plan. Most of the measures within the second Draft of the Action Plan are therefore targeted at improving traffic flows within the two AQMAs through partnership working with HE and Midlands Connect. More details are provided in Section 2.2.

Conclusions and Priorities

This ASR concludes that over the past two years, AQMA No.1 encompassing the A5 Muckley corner junction continues to experience exceedances of the annual mean NO_2 objective. Meanwhile AQMA No.2 for the A38 no longer exceeds the annual mean NO_2 objective, however concentrations are still within 10% of the objective at some locations. There are no plans to revoke either AQMA. Overall NO_2 concentrations have shown a slight decline across the District over the past six years and no new exceedances at relevant receptors have been identified outside of the AQMAs.

The key priorities for the coming reporting year are:

- To address any responses from key stakeholders on the consultation of the second draft of the AQAP. The consultation period is for six weeks and is due to finish early August 2019.
- To form a working group with other affected authorities and engage with HE in pursuit of securing a commitment from them to consider measures to ease congestion on the A38 and in particular the A5. The option of upgrading the A38 and A5 to expressway status will be revisited as part of this. As HE have so far underspent nationwide on interventions with an estimated £75 million left to spend by March 2020, early engagement is vital. Initial discussions have already commenced with HE as of late June 2019 and it is understood

HE have undertaken a study on congestion specifically at Muckley Corner, the findings of which should soon be available.

- To work more closely with the Midlands Connect Partnership to understand better how their proposals will encourage greater use of the M6 Toll and how the A5 could benefit from these and where necessary / feasible consider additional or alternative measures.
- LDCs Environmental Protection Team will also work closely with the Planning Department in formulating an air quality policy for the District as part of the review of the Local Plan 2020-2036 Preferred Options and Policy Directions, with a focus on EV charging infrastructure. In conjunction to this LDC will continue to work with the other Staffordshire authorities in rolling out a county-wide Supplementary Planning Guidance for Planners and Consultants in pursuit of adopting early in 2020.
- To continue to monitor air quality within the District and in particular within the AQMAs and review the monitoring network as and where necessary.
- To consider any Office of Low Emission Vehicle (OLEV) or air quality grant funding for continuous air quality monitors as and when they become available.
- To report on the progress of the aforementioned measures and any additional ones either planned or implemented in the next ASR due for submission by 30th June 2020.

Local Engagement and How to get Involved

Due to the main source of air pollution within Lichfield District Council being from transport sources, the easiest way for the public to get involved in aiding air quality improvements within the area would be to look at alternatives modes of travel. The following are suggested alternatives to private travel that would contribute to improving air quality within the District:

Commute

- Leaving the car at home one day a week. Further guidance can be found within http://www.staffssaferroads.co.uk/
- Using public transport whenever practicable which will reduce the number of private vehicles in operation thereby reducing pollutant concentrations through the number of vehicles and reducing congestion;

- Avoid vehicle idling and/or use of air conditioning running continuously. By switching your engine off you can save fuel, money and improve local air quality.
- Walk or cycle if your journey allows – From choosing to walk or cycle for your journey the number of vehicles is reduced and also there is the added benefit of keeping fit and healthy. In addition many of the cycle routes are off-road meaning you are not in close proximity to emissions from road traffic sources. Information on cycle routes within the Lichfield area is currently available on Staffordshire County Council's website at the following link, https://www.staffordshire.gov.uk/Transport/cycling/Documents/Cycling-in-Lichfield-including-Burntwood-Issue-5.pdf;
- Car/lift sharing – Where a number of individuals are making similar journeys, such as travelling to work or to school car sharing reduces the number of vehicles on the road and therefore the amount of emissions being released. This can be promoted via travel plans through the workplace and within schools. Staffordshire County Council have provided an online database where people can search for other people close by which they can share their journey to work with. This is provided through the Staffordshire Share-A-Lift scheme at https://share-a-lift.co.uk/; and
- Alternative fuel / more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel efficient cars are available and all have different levels of benefits by reducing the amount of emissions being released.

School Run

- Walking or cycling to school is not only good for health but it will save on fuel costs and help reduce local air pollution.
- Take turns with friends, neighbours or family to drive or walk the children to school. Check whether your school has a travel plan.

There are also a number of ways you can improve air quality from activities within your home or business, these are;

Energy Efficiency

- Improving the energy efficiency of your home / school / workplace will help reduce energy bills, as well as reducing emissions associated with power generation. The Energy Savings Trust (EST) which is a non-profit

organisation, funded by the government and private sector can provide independent and impartial advice to help consumers in lowering emissions and cut their energy bills. For further information, visit the EST website at https://www.energysavingtrust.org.uk/

Around The Home

- Use water-based or low solvent paints, glues, varnishes and wood preservatives, look for brands with a low VOC content.
- Have your central heating system checked regularly to avoid risking exposure to toxic carbon monoxide.
- Within the Lichfield District, Smoke Control Areas have been declared covering the settlements of Lichfield, Burntwood, Armitage / Handsacre and Fazeley at the eastern district boundary with Tamworth Borough Council. In a Smoke Control Area you need to make sure that any appliance is exempt or is included in the list of authorised fuels. Defra keeps a list of approved appliances and authorised fuels that are permitted for use in smoke control areas at https://smokecontrol.defra.gov.uk/appliances.php?country=england. Furthermore ready to use wood bought from a Woodsure Certified Supplier (www.woodsure.co.uk), will offer the following benefits:
    - Dry, ready to burn wood/logs & briquettes make any appliance more efficient.
    - Burning dry wood instead of wet wood is part of the solution to reducing the impact on our environment.
    - Burning wet wood increases emissions and has a greater impact on air quality.
    - Any appliance and chimney system will suffer from smoke produced from wet wood, which increases maintenance and repair requirements, making it harder for chimney sweeps to keep systems in safe, effective condition.
    - Burning waste and treated wood (e.g. old furniture) can emit harmful fumes.

Other Considerations

- When planning days out or journeys to work, check the air pollution forecast at https://uk-air.defra.gov.uk/forecasting/

- Be energy efficient - make sure your house is well insulated and use energy efficient appliances https://www.energysavingtrust.org.uk/home-energy-efficiency
- Refrain from having bonfires or barbecues when air pollution levels are high.
- Never burn household waste, especially plastics, rubber and treated timber.
- LDC's annual air quality reports are accessible from https://www.lichfielddc.gov.uk/downloads/download/47/air-quality-monitoring-reports.

Global Action Plan, a charity that is working for a green and thriving planet have for the first time provided a hub called the Clean Air Hub, that brings together public accessible information on air pollution all in one place. Whether you want to learn more about what air pollution is, how it affects your health, what you can do to protect yourself from it and the action you can take to tackle it, then the collection of information, resources and expert advice on the Clean Air Hub will help and inspire you to get informed and involved. The Clean Air Hub can be accessed from the following web link; https://www.cleanairday.org.uk/pages/category/clean-air-hub

For enquires or suggestions on how to improve air quality please contact Environmental Protection on:

Tel: 01543 308213 or Email: pollution@lichfielddc.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Lichfield District Council (LDC) during 2017 and 2018. 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 meeting the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by LDC to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

AQMAs are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an AQAP within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by LDC can be found in Table 2.1. Further information related to the declared AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=147. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides maps of air quality monitoring locations in relation to the AQMAs.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
A5 Muckley Corner AQMA no.1	01/08/2008	NO_2 Annual Mean	Lichfield	An area encompassing the Muckley Corner Roundabout on the A5 along with fourteen surrounding buildings.	YES	51	$\mu g/m^3$	44.9	$\mu g/m^3$	Air Quality Action Plan - Lichfield District Council	27/06/2019 Draft	www.lichfielddc.gov.uk/aqap
A38 AQMA no. 2	01/08/2016	NO_2 Annual Mean	Lichfield	A38 from the junction of A5127 Streethay north to Alrewas	YES	35.7	$\mu g/m^3$	38.3	$\mu g/m^3$	Air Quality Action Plan - Lichfield District Council	27/06/2019 Draft	www.lichfielddc.gov.uk/aqap

☒ **Lichfield District Council confirms the information on UK-Air regarding their AQMA(s) is up to date**

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

LDC did not submit an ASR during 2018, however in an email from the LAQM helpdesk (dated 31st May 2019) it was confirmed that data from 2017 and 2018 could be presented as a combined report within the 2019 ASR. The most recent annual report appraised by Defra was therefore the 2017 ASR. Defra accepted the findings of the 2017 ASR.

LDC has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2. and the commentary below.

Since the previous ASR was completed, the key action taken by LDC has been the AQAP setting out measures that are applicable to both AQMAs. Source apportionment was undertaken in 2017 as part of the first draft of the AQAP. This highlighted that for AQMA No.1 at Muckley Corner, 41.8% of NO_2 concentrations were attributed to road traffic, and in AQMA No.2 for the A38 the figures were even higher at 56.7%. In the case of the Muckley Corner AQMA, source apportionment showed that a disproportionate amount of road traffic was attributed to HGVs at 20.2% of overall NO_2 across all modelled locations. In line with the methodology presented in Box 7.6 of LAQM.TG(16)[4], the necessary reduction in Road NO_x emissions required to bring each AQMA into compliance was calculated for each worst-case exposure location. This demonstrated that a 25% reduction in NO_x was required for the A5 Muckley Corner AQMA and a 40.3% reduction was required for the A38 AQMA. The focus of proposed AQAP measures were then divided into five targeted categories;

1) Transport measures – provision of additional transport infrastructure, changes to road layout or operation, formulation of traffic plans, with the aim being to encourage the use of greener modes of transport and/or reduce congestion and associated vehicle emissions;
2) Leading by example measures – measures that LDC will implement to encourage wider behavioural changes;

[4]Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance (TG16), February 2018 Update, available at http://laqm.defra.gov.uk.

3) Education, community and partnership measures – provision of information to increase community awareness to facilitate behavioural change;
4) Statutory measures – use of legislation and targeted enforcement to control air pollution; and
5) Air quality monitoring – ensure satisfactory air quality monitoring data and evidence base is available to allow effective management of air quality.

The first draft of the AQAP (see Table C.4 in Appendix C for a summary of the measures) went out for consultation in 2017/18 to LDC Councillors and officers, residents / businesses within or close to the AQMAs, Staffordshire County Council Highways, neighbouring local authorities, Highways England (HE), the M6 Toll operators (Midland Expressways Ltd) and Defra who approved the first Draft.

Consultations with HE who are the key organisation that have the ability to implement the proposed measures was particularly challenging and was met with barriers. Their main comments were:

- The first AQAP Draft stated that HE had an ambition to redress the balance of how the M6 Toll and A5 work together. HE suggested that while this is an ambition, it may not be feasible as the M6 Toll is not under their control.
- At the time of the consultation HE stated that there were no definitive plans to upgrade either the A5 or A38 to expressways. HE suggested that while this was not being proposed at the time, LDC should maintain dialogue with them. It was also known that Councillors in other authorities were lobbying MPs to bring this measure back to the table.
- In terms of Urban Traffic Management and Control (UTMC) on the A38 (i.e. measure 4 in the first draft AQAP) there was no clear indication from HE as to whether this was possible.
- HE clearly stated that a ban on certain vehicle types on the strategic road network (i.e. measure 5 in the first draft AQAP) would not be possible.
- Alternative measures were suggested by HE, such as physical barriers to trap air pollutants and speed management options but neither of these would be relevant or feasible to the AQMAs.

LDC also included a measure in the first Draft AQAP for the M6 Toll operator, Midland Expressways Ltd to change their pricing policy to incentivise users to make more use of the M6 Toll, thus reducing the amount of traffic using the A5. However, Midland Expressways in their consultation response stated that there was no intention to change the pricing structure. In fact toll fees have increased twice since then.

In contrast to the stance from the M6 Toll operators, the Midlands Connect Partnership (which is a collaboration of local authorities including Staffordshire County Council, Local Enterprise Partnerships and other key partners from across the Midlands) introduced some proposals via the Long Term Motorway Hub Strategy (June 2018) to make best use of the M6 Toll and thereby reduce congestion. Whilst these proposals are aimed primarily at diverting traffic from the M6 to the M6 Toll at peak times of congestion or during incidents, it is understood there is some potential to divert some traffic away from the A5 too.

Concerns from members were also raised with regards to resource implications of some of the proposals in the first draft AQAP and that some of the measures would have little impact on the AQMAs. Anti-idling enforcement (i.e. measure 10 in the first draft AQAP) in particular was considered likely to be ineffective on the A38 or approaching the roundabout at Muckley Corner where long term idling is generally not an issue.

Following consideration of the comments from the first draft of the AQAP and in particular the responses from HE and proposals from Midlands Connects, the AQAP was amended to reflect the situation. Previous measures 4, 5, 6, 9 and 10 in the first draft of the AQAP were removed. Previous measure 7 for encouraging modal shift will be delivered as part of a measure to improve public awareness through education initiatives and website updates, now measure 7 in the second Draft AQAP. Previous measure 8 will be pursued through the planning process and in particular as part of new developments, now measures 8 and 9 in the second Draft. Previous measure 11 for improvements to Lichfield Trent Valley rail station have largely been delivered, but their impact on air quality within the AQMAs would be negligible and therefore has been removed. Further improvements to both railway stations in Lichfield are planned as part of the Integrated Transport Strategy being delivered by Staffordshire County Council. An update on these measures is provided in Appendix C.

At the time of writing this ASR, the second Draft AQAP has gone out for full public consultation (i.e. from the 24th June 2019) for a six week period. The consultation period is due to finish early August 2019. The key actions in the second Draft AQAP are summarised in Table 2.2 and can be compared with the measures from the first draft AQAP outlined in Table C.4 in Appendix C.

Defra have now appraised the second draft of the AQAP. The key issues raised by them are:

1) **Commentary:** Unclear what processes were followed in eliminating some of the measures in the first Draft AQAP (i.e. previous measures 4 to 11)

   Actions taken to address: Already explained above

2) **Commentary:** Lack of quantification of the level of emissions reductions and NO_2 reductions likely to be achieved for each measure and within each AQMA.

   Actions taken to address: Providing quantified reduction targets and KPIs for Action Plan measures has so far proven difficult to address. The main difficulties have been that the primary measures required to reduce NO_2 concentrations within both AQMAs relate to strategic roads with a large proportion of through traffic. These roads are under the control of HE and therefore LDC has no direct control over interventions. HE were consulted on the first draft of the Action Plan, which proved difficult to get. Once a response was received it was found that there were no plans at that time to deliver the proposed highway measures specific to each AQMA. Alternative measures have since been proposed in the second Draft AQAP, but at this stage are more aspirational and subject to a commitment from HE and other relevant partners. Further details are provided in Table 2.2 and further commentary later in this section. Other measures in the Draft Action Plan are generic and deliver air quality benefits over much wider areas.

3) **Commentary:** Unclear roles, responsibilities and timescales for completion of proposed measures and evaluation of their effectiveness.

   Actions taken to address: For the reasons outlined in point 2 above, most of the measures specific to the two AQMAs are outside of LDC's direct control, which makes it difficult to specify delivery dates. Therefore in terms

of focussed specific actions, a commitment from HE is needed and additional funding may be required to deliver the measures. As such, these actions are aspirational rather than fully formed plans at this stage and have therefore been broken down to planning phase actions, rather than specific dates for implementation.

LDC therefore expects the following key priorities to be delivered over the course of the next reporting year:

- To address any responses from key stakeholders on the consultation of the second draft of the AQAP.
- To secure a commitment from HE in proposing measures to ease congestion on the A38 and in particular the A5. The option of upgrading the A38 and A5 to expressway status will be revisited as it is considered this would be of major benefit to the AQMAs, especially Muckley Corner where there is consistently congestion around the roundabout. Whilst the decision to upgrade the A38 and A5 to Expressways is outside of the Council's control, it is considered important that pressure is maintained. By setting a working group up with other local authorities where the A38 and A5 traverse it is considered that air quality issues on both trunk roads could be pushed up the HE agenda as a cross boundary issue. Furthermore, it is understood HE have underspent nationwide on the £100 million given to them to deliver air quality improvement measures between 2015 and 2021. With an estimated £75 million having to be spent before March 2020 it is vital to start discussions with HE over the coming months to try and influence decisions on what schemes are taken forward and how they should be prioritised. Initial discussions have already commenced with HE as of late June 2019 and it is understood HE have undertaken a study on congestion specifically at Muckley Corner, the findings of which should soon be available
- To work more closely with the Midlands Connect Partnership to understand better how their proposals will encourage greater use of the M6 Toll and how the A5 could benefit from these and where necessary consider additional or alternative measures.
- LDCs Environmental Protection Team will also work closely with the Planning Department as part of the review of the Local Plan 2020-2036

Preferred Options and Policy Directions. Currently the Local Plan contains no specific locations for development, but it is considering policy directions. The Preferred Options and Policy Directions review has been the subject of recent public consultations which asked whether a specific policy on air quality should be included within the Local Plan. A number of representations have been received by the Planning Department which highlighted a need for an air quality policy. Options on how to proceed effectively with this are currently being considered in liaison with Planning and will continue over the next reporting year. One of the key areas being considered is provision of Electric Vehicle Charging Infrastructure for new developments. The Government published Driving for the Future in 2013 to ensure almost every vehicle is zero emissions by 2050 and for the cessation of sale of all new conventional petrol and diesel cars and vans by 2040. Through the governments' 2018 Road to Zero strategy further targets for at least 50%, and as many as 70%, of new car sales and up to 40% of new van sales being ultra-low emission by 2030 have been set. Electric vehicles currently represent the most viable zero emission option, and therefore it is important the EV charging infrastructure is in place to encourage uptake of EVs.

- Linking into this is the development of Supplementary Planning Guidance for Planners and Consultants. Currently this is being developed through the SAQF with a view to rolling out county-wide so as to be consistent in the methodology and the appraisal of air quality assessment reports. This should serve to benefit the quality of information coming in as part of the application, and therefore enable Officers to make better and more informed decisions relating to air quality impacts and choice of mitigation measures.

The principal challenges and barriers to implementation that LDC anticipates facing are that most of the aforementioned measures are out the Council's direct control. Most relate to interventions that would specifically target traffic flow on strategic roads for which HE or Midlands Connect would be the lead authorities. However, forming a working group with neighbouring authorities and early discussions with HE will help to strengthen the chance of securing a commitment from them and help enable any unspent/ring-fenced funds to be utilised for interventions for the A38 and A5.

With regards to the Midlands Connect schemes, there is no guarantee their interventions to divert traffic from the M6 to the M6 Toll will have a commensurate or measurable impact on the A5. However, LDC remain committed to work closely with Midlands Connect and will discuss alternative measures where necessary.

Once a commitment has been sought from HE, Midlands Connect and other relevant parties for specific measures for the AQMAs, LDC will be in a better position to specify exact emission reduction targets and project dates for implementation, as well as methods for evaluating their effectiveness. The AQAP will then be updated again.

Progress on the Staff Travel Plan for LDC employees and education initiatives, including improvements to the website have fallen short of the target dates set out in the second draft of the AQAP (also shown in Table 2.2). The main reasons for this have been resource constraints and changeover of staff over the past two years. LDC plan to update the website with air quality information and make a start on the staff travel plan over the coming reporting year. The first stage in developing the LDC Staff Travel Plan will be employee questionnaires to identify commuting patterns and barriers to use of greener modes of travel and will seek ways to overcome these barriers.

Longer term, LDC will look at establishing a rolling programme for replacing older more polluting vehicles in the fleet with newer cleaner vehicles and retrofitting old Council owned HGVs and Buses with pollution abatement equipment where technically and financially feasible.

Funds for the Eco-Stars Recognition scheme ended in 2018, but it is understood that TRL are still honouring new members to complete the contractual quota, which has not quite been met. At this stage there are no plans to seek further funds for this scheme as the benefits to the AQMAs in all of the Staffordshire Authorities has been negligible. This measure will be removed and replaced where necessary with any suitable alternatives in any amendments to the AQAP.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, LDC anticipates that further additional measures not yet prescribed may be required in subsequent years to achieve compliance and enable the revocation of both AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Eco-Stars	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Lichfield DC and supporting Third Party	N/a	Ended	Reduction in fuel consumption & emissions	Air quality benefits from the scheme have found to be small	Funds for scheme have ended	2018	http://www.ecostars-uk.com/
2	Increase the volume of through traffic using M6 Toll	Traffic Management	UTC, Congestion management, traffic reduction	Midlands Connect Partnership	Planning	Not yet commenced	Reduction in HGV % in AQMAs	<tbc after quantitative appraisal>	Report outlining proposals by Midlands Connect has been produced and LDC will work with neighbouring authorities and Midlands Connect	2020	Subject to work undertaken by Midlands Connect Partnership
3	Upgrading Trunk A-Roads to Expressways	Traffic Management	UTC, Congestion management, traffic reduction	Highways England	Stalled	Not yet commenced, subject to commitment from HE	Reduction in traffic congestion	<tbc after quantitative appraisal>	Initial discussions with HE arranged for late June 2019	Unknown	Subject to Highways England engagement – this measure may never happen but it included as Lichfield DC is committed to maintain pressure for it to happen
4	Pollution abatement equipment for HGVs	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Lichfield DC/OLEV	2017/18	2018-2022	vehicles retrofitted	Reducing emissions contribution from HGVs	Planning Phase	2022	Consider OLEV or AQ grant application funding
5	Replacing older vehicles	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	Lichfield DC/OLEV	2017/18	2018-2022	vehicles replaced (in addition to normal fleet turnover)	Reducing emissions from all council owned vehicles	Planning Phase	On-going	Consider OLEV or AQ grant application funding
6	Travel planning amongst LDC employees	Promoting Travel Alternatives	Workplace Travel Planning	Lichfield DC	2018	2018-2022	Implementing travel plan by end of 2018	Reducing emissions from LDC employees	Planning Phase	2019	Requires employee education and engagement

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
7	Education Initiatives Inc. website information updates	Public Information	Other	Lichfield DC	2018/19	2018-2022	New website information by end 2018	Through public awareness	Planning Phase	2019	
8	Staffordshire Air Quality Forum	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	County-wide	Completed	On-going	Full LA engagement across the group + Regular Meetings	N/a	On-going	On-going	Partnership to continue indefinitely
9	Use the planning regime to minimise impact of new developments on AQMAs	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Lichfield DC / Staffordshire AQ Forum	Ongoing	Ongoing	Supplementary Planning Guidance implemented	Reducing emissions contribution and restricting impact on AQMAs	On-going, discussions around partnership joint guidance to follow	2019	Staffordshire-wide Planning Guidance under development but requires some buy in from other authorities
10	Inspect under the Environmental Permit regime and enforce legislation to reduce combustion processes	Environmental Permits	Introduction/ increase of environment charges through permit systems and economic instruments	Lichfield DC	Completed	On-going	Installations adhering to permits and enforcement/penalties for breaches	By restricting emissions from industrial processes	On-going	Continual	This is standard LDC work in Environmental Protection
11	Air quality monitoring	Public Information	Other	Lichfield DC/Defra	On-going	On-going	# monitoring locations and On-time submittal of ASRs	Through EHO/public awareness	On-going annually	Annual	Possibly liaise with Defra regarding need for additional monitoring and/or AURN funding. Consider continuous monitoring and AQ grant application

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.

Particulate matter, or PM, is the term used to describe particles found in the air, including dust, dirt and liquid droplets. PM comes from both natural and man-made sources, including traffic emissions and Saharan-Sahel dust. These particles can be suspended in the air for long periods of time, and can travel across large distances.

PM less than 10 micrometres in diameter (PM_{10}) pose a health concern because they can be inhaled into and accumulate in the respiratory system. PM less than 2.5 micrometres in diameter ($PM_{2.5}$) are referred to as "fine" particles and are believed to pose the greatest health risks, as they can lodge deeply into the lungs and also pass into the bloodstream.

$PM_{2.5}$ is the pollutant which has the biggest impact on public health and on which the Public Health Outcomes Framework (PHOF) indicator 3.01[4] is based.

The Royal College of Physicians (RCP) undertook a review in February 2016, where they found that long term exposure to air pollution impairs lung function growth in children, and that outdoor exposure is linked to lung cancer in adults[5]. Within Staffordshire it is estimated that 4.8% of all deaths can be attributed to exposure to $PM_{2.5}$, compared to 5.1% across England (40,000 deaths annually)[4]. Overall, the estimated cost to individuals and society is more than £20 billion annually for the UK

[4]Mortality attributable to particulate air pollution Public Health Outcomes Framework Public Health Outcomes Framework 2016 – 2019 indicator 3.01 Fraction of mortality attributable to particulate air pollution https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/102/are/E10000028/iid/30101/age/230/sex/4

[5] ['Every Breath we take: The Lifelong Impact of Air Pollution; Report of a working Party, February 2016, ISBN 978-1-86016-567-2],

2.3.1 Particulate Matter ($PM_{2.5}$) Levels in Staffordshire and Stoke-on-Trent

A number of the Staffordshire Authorities currently monitor locally for PM_{10}. Defra's Automatic Urban and Rural Network (AURN) site, Stoke-on-Trent Centre has a dedicated $PM_{2.5}$ monitor. Table 2.3 presents data on the local level of $PM_{2.5}$ annual mean concentrations for the Staffordshire Authorities. Where the data is derived from PM_{10} monitoring this has been adjusted by applying a correction factor of 0.7 to derive the $PM_{2.5}$ component. The correction factor has been derived from the average of all ratios of $PM_{2.5}/PM_{10}$ for the years from 2010 to 2014 for forty sites within the Automatic Urban and Rural Network (AURN) where these substances are measured on an hourly basis and follows the guidance published in LAQM (TG16).

Table 2.3 - Annual Mean PM_{10} and $PM_{2.5}$ results of monitoring by Staffordshire Authorities 2014 to 2018

Annual Mean PM_{10} and $PM_{2.5}$ Results from monitoring Staffordshire Authorities 2014- 2018									
Authority	**Site Type**	**Monitor Location**	**OS Grid Ref**		**Year**				
					2014	2015	2016	2017	**2018**
Newcastle under Lyme	Roadside	Queen`s Gardens	E385057	PM_{10}	22	22.9	(5)	(5)	(5)
			N346137	$PM_{2.5}$	15.4(1)	16(1)	(5)	(5)	(5)
Cannock Chase	Roadside	Cannock A5190	E401392	PM_{10}	-	-	-	14	18
			N309954	$PM_{2.5}$	-	-	-	9.8	12.6
Stoke on Trent	Roadside	Basford	E386288	PM 10	-	-	-	23	23
			N346802	$PM_{2.5}$	-	-	-	16	16
	Roadside	A50 Meir Tunnel	E392548	PM_{10}	-	20(2)	20(2)	18	19
			N342572	$PM_{2.5}$	-	14(2)	14(2)	13	13
	Urban Background	Stoke on Trent Central	E388351 N347895	$PM_{2.5}$	10	12	12	9	9
	Roadside	Middleport	E385780	PM_{10}	24	22	(3)	(3)	(3)
			N349376	$PM_{2.5}$	17(1)	15(1)	(3)	(3)	(3)
East Staffordshire	Roadside	Derby Turn	E424671	PM_{10}	31	23	(4)	(4)	(4)
			N324019	$PM_{2.5}$	21.7(1)	16.1(1)	(4)	(4)	(4)

Notes: (1) $PM_{2.5}$ results are derived from PM_{10} monitored results corrected with a 0.7 correction factor in accordance with TG16 – Annex B: Derivation of $PM_{2.5}$ to PM_{10} Ratio. All other results are directly monitored.
(2) Valid data capture for 2015 was 59%. The site was commissioned on 22 May 2015.
(3) Middleport monitor was decommissioned at the end 2015
(4) East Staffordshire`s monitors were decommissioned 2016
(5) Newcastle under Lyme monitors were Decommissioned 2016

As can be seen from the results, concentrations of $PM_{2.5}$ within the Staffordshire Authorities are below the 2020 EU limit value of 25µg/m^3.

2.3.2 $PM_{2.5}$ and Mortality in Staffordshire & Stoke-on-Trent

Although the levels of $PM_{2.5}$ within the County and City of Stoke on Trent are below the 2020 EU Limit value, the impact on adult mortality directly attributable to $PM_{2.5}$ is nonetheless still an important public health issue within Staffordshire and Stoke-on-Trent. This is revealed in data obtained from Public Health England used to inform Public Health Outcomes Framework indicator 3.01[4], as shown in Table 2.4.

The percentage estimated number of deaths attributable to $PM_{2.5}$ in adults over 30 has been translated into the estimated number of attributable deaths for each local authority area within Staffordshire, and are shown in Table 2.5. The data presented to 2017 is the latest data available at the time of publication of this report. Approximately 5% of deaths within the County can be attributed to $PM_{2.5}$.

Table 2.4 - Estimated number of deaths by local authority area attributable to $PM_{2.5}$ within Staffordshire for adults over 30: 2013 to 2017

District/County	Percentage
Newcastle-under-Lyme	4.5%
Stafford	4.7%
East Staffordshire	5.1%
South Staffordshire	4.9%
Lichfield	5.0%
Staffordshire Moorlands	4.3%
Cannock Chase	5.0%
Tamworth	5.4%
Stoke on Trent	4.8%
Staffordshire County	4.8%
England	5.1%

[4] Public Health Outcomes Framework 2016-2019 Indicator 3.01 Fraction of mortality attributable to particulate air pollution https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/520457/At_a_glance.pdff

Table 2.5 - Public Health Outcomes Framework Indicator 3.01 - Fraction of annual all cause adult mortality attributable to anthropogenic (human made) particulate air pollution (measured as fine particulate matter, $PM_{2.5}$) for Staffordshire Authorities 2013 to 2017

Estimated numbers of annual all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, $PM_{2.5}$*) for Staffordshire 2013 to 2017[6]
*** Fraction of annual all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, $PM_{2.5}$*)**

	2013			2014			2015			2016			2017		
District/County	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths
Newcastle-under-Lyme	1295	4.9	60	55	4.7	60	55	4.2	50	1291	4.7	60	1197	4.2	50
Stafford	1261	4.9	60	65	4.8	60	60	4.7	60	1254	4.8	60	1267	4.3	50
East Staffordshire	1097	5.1	60	55	5.1	50	55	4.8	50	1065	5.6	60	1098	5.0	50
South Staffordshire	1102	5.1	60	55	5	50	55	4.7	60	1128	5.1	60	1239	4.5	60
Lichfield	1050	5.1	50	50	5	50	50	4.6	50	1044	5.5	60	1070	4.9	50
Staffordshire Moorlands	1085	4.7	50	45	4.5	50	45	4	40	1110	4.6	50	1127	3.9	40
Cannock Chase	787	5.1	40	45	5.1	40	45	4.6	40	879	5.4	50	940	4.7	40
Tamworth	592	5.5	30	35	5.4	30	30		30	615	6	40	634	5.3	30
Stoke on Trent	2412	5.2	125	2318	5.0	115	2479	4.9	110	2454	5.0	120	2490	4.4	110
Staffordshire County	8269	5	420	400	4.9	400	390	4.5	390	8386	5.2	430	8572	4.5	390

[6] Source Public Health England https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/102/are/E10000028/iid/30101/age/230/sex/4

2.3.2.1 Actions being taken within Staffordshire to reduce $PM_{2.5}$

A number of the Staffordshire Authorities are currently involved in implementing measures to reduce levels of NO_2 within their areas, which are detailed elsewhere in this report. Whilst there is currently no statutory duty imposed on Local Authorities in England to reduce $PM_{2.5}$, a number of the measures are complementary. A mapping exercise completed by the SAQF members details the measures currently in place, which are considered to have an impact on reducing $PM_{2.5}$ within the County. These are produced in Table 2.4 below and those applicable to the Lichfield District are highlighted in light green;

Table 2.4 - Actions being taken within Staffordshire to reduce $PM_{2.5}$

Measures category	Measure Classification	Effect on reducing NOx and PM_{10} emissions(low, medium, high)	Reduces $PM_{2.5}$ emissions	Local Authority								
				Stoke on Trent CC	Staffordshire Moorlands DC	Newcastle under Lyme BC	Stafford BC	Cannock Chase DC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC
Traffic Management	**Urban Traffic Control systems, Congestion management, traffic reduction**	low	✓	✓	UTC in Leek Town Centre	UTC in areas of Newcastle Town Centre AQMA and Kidsgrove AQMA	UTC in Stafford Town Centre	UTC in Cannock Town Centre	Town Centre Regeneration Programme a number of schemes are currently being progressed which will aid traffic management. Many of these will then help improve traffic flow within the AQMA	LDC is liaising with Midlands Connect to increase volume of traffic using M6 Toll to reduce congestion on the A5 as well as lobbying Highways England to upgrade the A38 & A5 to expressways.		UTC in Tamworth Town Centre at Ventura Park
	Reduction of speed limits, 20mph zones	low	✓	✓			20mph zones near some schools in residential areas	20mph zones in Brereton, Hendesford and Rugeley & Plans for Norton Canes	20 mph zones near some schools in residential areas	.	20mph zones in Trysull, Bradley, Kinver and Bilbrook	
	Road User Charging (RUC)/ Congestion charging	low	✓					M6 Toll		M6 Toll	M6 Toll	
	Anti-idling enforcement	low	✓									
	Other		✓									
Promoting Travel Alternatives	**Workplace Travel Planning**	low	✓	A limited programme delivered through DfT Access Fund	Staffordshire CC has successfully acquired funding for a 2 year work & school travel plan programme for work in the vicinity of AQMAS in Staffs & Stoke. https://www.staffordshire.gov.uk/transport/greentravel/travelplans/home.aspx							
	Encourage / Facilitate home-working	low	✓	Agile working adopted by Stoke-on-Trent CC			✓	Homeworking policy adopted	Homeworking policy adopted	Homeworking policy adopted	Agile working policy adopted	Homeworking policy adopted
	School Travel Plans	low	✓	Mode shift STARS	https://www.staffordshire.gov.uk/activeschooltravel							
	Promotion of cycling	low	✓	Stoke-on-Trent Cycle Map & Guide	https://www.staffordshire.gov.uk/transport/cycling/Cycle-maps/cyclemaps.aspx							
	Promotion of walking	low	✓	Travel Smart	https://www.staffordshire.gov.uk/environment/eLand/RightsofWay/PromotedRoutes/home.aspx							
	Staffordshire Share a Lift Scheme		✓	Stoke on Trent Share a Lift Scheme	https://www.staffordshire.gov.uk/transport/greentravel/carsharing/Car-sharing.aspx							
	Promote use of rail and inland waterways	medium	✓	North Staffordshire Community Rail Partnership	North Staffordshire Community Rail Partnership operating along the North Staffordshire Line includes Blythe Bridge Rail Station. The County Council Draft Rail Strategy is available from: http://moderngov.staffordshire.gov.uk/documents/s69891/Appendix%201%20for%20Rail%20Strategy.pdf	North Staffordshire Community Rail Partnership operating along the North Staffordshire Line includes Blythe Bridge Rail Station. The County Council Draft Rail Strategy is available from: http://moderngov.staffordshire.gov.uk/documents/s69891/Appendix%201%20for%20Rail%20Strategy.pdf	North Staffordshire Community Rail Partnership operating along the North Staffordshire Line includes Blythe Bridge Rail Station. The County Council Draft Rail Strategy is available from: http://moderngov.staffordshire.gov.uk/documents/s69891/Appendix%201%20for%20Rail%20Strategy.pdf	SCC is a member of West Midlands Rail Ltd which will bring a change in the way that local rail services are managed and operated. The County Council Draft Rail Strategy is available from: Link & Link	Improvements at Burton Rail Station commenced.	Staffordshire County Council has produced a Draft Rail Strategy, April 2016 to improve the way local rail services are managed and operated https://www.staffordshire.gov.uk/transport/transportplanning/Rail-strategy/Rail-Strategy.pdf		

Measures category	Measure Classification	Effect on reducing NOx and PM_{10} emissions (low, medium, high)	Reduces $PM_{2.5}$ emissions	Local Authority								
				Stoke on Trent CC	Staffordshire Moorlands DC	Newcastle under Lyme BC	Stafford BC	Cannock Chase DC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC
Transport Planning & Infrastructure	**Local Transport Plans and District Strategies**	high	✓	Local Transport Plan					https://www.eaststaffsbc.gov.uk/sites/default/files/docs/planning/planningpolicy/examination/c/C43IntegratedTransportStrategyamended14thJuly2014.pdf			
	Public transport improvements- interchanges stations and services	low	✓			Kidsgrove Station interchange plans	Recent improvements completed at Stafford Rail Station	Planned improvements at Cannock Station as part of Mill Green development	Improvements at Burton Rail Station commenced.	Improvements planned at Lichfield City Station as part of Friarsgate development scheme. There are also plans to improve accessibility to all users at Lichfield Trent Valley Station		Planned improvements at Tamworth station
	Public cycle hire scheme	low	✓	Stoke Railway Station 'Brompton Dock' Bike Hire & Cycle Hub				In house Cycle to work scheme				
	Cycle network	low	✓	A comprehensive network of on-street & traffic free routes. A forthcoming LCWIP will identify where improved maintenance & connectivity required.	www.saffordshire.gov.uk/transport/cycling/cyclemaps/cyclemaps.aspx							
	Bus route improvements	high	✓	Transforming Cities Fund is currently investigated options for some limited improvements.	Potential bus stop upgraded in Cheadle Town Centre	RTPI routes 3 & 4 Newcastle Town Centre. Improved future bus services to Chatterley Valley	Improved bus priority and interchange on A518, Stafford post-SWAR	RTPI & improved stops at key locations within Rugeley. Upgraded bus stops to serve Cannock rail station	Removal of obstructions on New Street.	.	Bus stop upgrades in Wombourne.	Improved bus infrastructure route 2 Tamworth-Perrycrofts. RTPI Tamworth Town Centre and Ventura Park. Victoria Road, Tamworth upgraded interchange.
Alternatives to private vehicle use	**Bus based Park & Ride**	medium	✓					nil		New bus central station as part of Friarsgate development scheme		
	Car Clubs	low	✓					nil				
Policy Guidance and Development Control	**Planning applications to require assessment of exposure / emissions for development requiring air quality impact assessment**	high	✓				✓	Local plan - Policy CP16 - Climate Change and Sustainable Resource Use Cannock chase. Www.cannockchasedc.gov.uk/sites/default/files/local_plan_part_1_09.04.14_low_res.pdf	http://www.eaststaffsbc.gov.uk/planning/planning-policy/local-plan-2012-2031	https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Planning-policy.aspx		Local & National Validation requirements 2017: http://www.tamworth.gov.uk/sites/default/files/planning_docs/National-and-Local-Validation-requirements-2017.pdf

Measures category	Measure Classification	Effect on reducing NOx and PM_{10} emissions(low, medium, high)	Reduces $PM_{2.5}$ emissions	Local Authority								
				Stoke on Trent CC	Staffordshire Moorlands DC	Newcastle under Lyme BC	Stafford BC	Cannock Chase DC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC
Policy Guidance and Development Control	**Air Quality Strategy**		✓	Local Air Quality Strategy - Stoke-on-Trent City Council			✓	nil	http://www.eaststaffsbc.gov.uk/environmental-health/pollution/air-quality			
	Planning Guidance for developers		✓	To develop planning guidance for developers and to develop into SPD once Local Plan Policies in Place			✓	http://www.cannockchasedc.gov.uk/residents/planning/planning-policy/supplementary-planning-policy-documents	http://www.eaststaffsbc.gov.uk/sites/default/files/docs/pollution/Air%20Quality%20Policy%20for%20Development%20Control%20%28Public%20Version%29.pdf			
	Developer Contributions based on damage cost calculation		✓	To develop policies to secure contributions to offset pollution				http://www.cannockchasedc.gov.uk/sites/default/files/local_plan_part_1_09.04.14_low_res.pdf	Yes			
	Planning Policies		✓	To influence policies to support improvements in emissions through development of Staffordshire and Stoke-on-Trent Joint Local Plan			✓		http://www.eaststaffsbc.gov.uk/sites/default/files/docs/pollution/Air%20Quality%20Policy%20for%20Development%20Control%20%28Public%20Version%29.pdf	https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Planning-policy.aspx		
	STOR Sites (Short Term Operating Reserve) Energy Generation. Regulation via planning / permitting regime	high	✓									
	Low Emissions Strategy	high	✓									

Measures category	Measure Classification	Effect on reducing NOx and PM_{10} emissions(low, medium, high)	Reduces $PM_{2.5}$ emissions	Local Authority								
				Stoke on Trent CC	Staffordshire Moorlands DC	Newcastle under Lyme BC	Stafford BC	Cannock Chase DC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC
Freight and Delivery Management	Freight Consolidation Centre	medium	✓									
	Route Management Plans/ Strategic routing strategy for HGV's	high	✓		https://www.staffordshire.gov.uk/transport/transportplanning/localtransportplan/appendixl-staffordshirefreightstrategy.pdf							
	Quiet & out of hours delivery	low	✓				✓	✓				
	Delivery and Service plans	medium	✓									
	Freight Partnerships for city centre deliveries	high	✓									
Vehicle Fleet Efficiency	Driver training and ECO driving aids	medium	✓	SOTCC provide driver assessment & driver CPC training service for drivers of large goods vehicles. SOTCC operational fleet fitted with Stop/Start technology where available to reduce fuel usage. 70% of SOTCC recycling waste collection vehicles have `Fuel Sense` technology fitted to reduce fuel usage.			✓	✓	✓			
	Promoting low emission public transport	high	✓									
	Vehicle retrofitting programmes	medium	✓	70% of SOTCC operational fleet meet, the EURO VI emission standard 90% of SOTCC`s waste collection vehicles have electric bin lifting equipment fitted to reduce fuel usage.						Retrofitting of old Council owned HGVs and Buses with pollution abatement equipment will be considered by the Council where technically and financially feasible		
	Fleet efficiency and recognition schemes	medium	✓	SOTCC are a 3 star member of Eco Stars Fleet Recognition Scheme	Staffordshire and Stoke-on-Trent Eco-Stars http://www.ecostars-uk.com/eco-stars-schemes/							

Measures category	Measure Classification	Effect on reducing NOx and PM_{10} emissions(low, medium, high)	Reduces $PM_{2.5}$ emissions	Local Authority								
				Stoke on Trent CC	Staffordshire Moorlands DC	Newcastle under Lyme BC	Stafford BC	Cannock Chase DC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC
Promoting low emission transport	Low emission zone (LEZ) Clean Air Zone (CAZ)	high	✓									
	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	high	✓	SOTCC`s procurement process includes the valuation of alternatively fuelled vehicles for the operational fleet. Services are challenged to consider alternatively fuelled vehicle at the point of replacement.				Waste fleet vehicles comply with Euro VI.				
	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	high	✓	SOTCC`s procurement process includes the evaluation of alternatively fuelled vehicles for the operational fleet.			✓			LDC looking to replacing old vehicles within the fleet with more modern cleaner vehicles, which comply with the prevailing EURO standard. This will be extended to all Council owned vehicles.		
	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	high	✓	SOTCC installed electric charging infrastructure in 2017 for the operational fleet.			✓					
	Priority parking for LEV's	high	✓	Electric Vehicle charging spaces						Electric Vehicle charging spaces		
	Taxi Licensing conditions	medium	✓	Hackney Carriage & Private Hire Licensing Policy 2016-2019								
	Taxi emission incentives	medium	✓	Successful joint bid for funds to install Taxi ELV charging points								
Environmental permits	Introduction/increase of environment charges through permit systems and economic instruments (Permit fees set centrally)	medium	✓				✓	Unable to achieve at a local level without central government approval				
	Measures to reduce pollution through IPPC Permits going beyond BAT	medium	✓	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211863/env-permitting-general-guidance-a.pdf (Chapter 15)								
	Large Combustion Plant Permits and National Plans going beyond BAT	high	✓									
	Other		✓									

Measures category	Measure Classification	Effect on reducing NOx and PM_{10} emissions (low, medium, high)	Reduces $PM_{2.5}$ emissions	Local Authority								
				Stoke on Trent CC	Staffordshire Moorlands DC	Newcastle under Lyme BC	Stafford BC	Cannock Chase DC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC
Other measures	**Smoky Diesel Hotline**		✓	https://www.gov.uk/report-smoky-vehicle								
	A5 and M6 Partnership		✓					http://www.hinckley-bosworth.gov.uk/info/10020/strategies_plans_and_policies/1272/a5_partnership		Strategy for the A5 2011-2026	Strategy for the A5 2011-2026	
	Domestic Smoke Control advice and Enforcement		✓	Smoke control advice	-	-	✓	http://www.cannockchasedc.gov.uk/residents/environmental-health/environmental-protection/chimney-smoke	http://www.eaststaffsbc.gov.uk/environmental-health/pollution/smoke-control-areas	https://www.lichfielddc.gov.uk/home-garden/bonfires-barbecues-smoke/1	https://www.sstaffs.gov.uk/environment/smoke-control-areas.cfm	
	Garden Bonfires - Advice and nuisance enforcement		✓	Garden bonfires advice	-	-	✓	http://www.cannockchasedc.gov.uk/residents/environmental-health/environmental-protection/bonfire-smoke-nuisance	http://www.eaststaffsbc.gov.uk/environmental-health/pollution/bonfires	https://www.lichfielddc.gov.uk/home-garden/bonfires-barbecues-smoke/1	https://www.sstaffs.gov.uk/crime-nuisances/bonfires-and-smoke.cfm	http://www.tamworth.gov.uk/air-quality
	Commercial burning advice and enforcement		✓		-	-	✓	http://www.cannockchasedc.gov.uk/residents/environmental-health/environmental-protection/bonfire-smoke-nuisance	http://www.eaststaffsbc.gov.uk/environmental-health/pollution/bonfires	https://www.lichfielddc.gov.uk/home-garden/bonfires-barbecues-smoke/1		http://www.tamworth.gov.uk/air-quality
	Multi agency working with Fire Service and Environment Agency for trade burning		✓		-	-	✓	Information shared as appropriate		Information shared as appropriate		Information shared as appropriate
	Multi agency working with Staffordshire Fire Service and Local Authority Building Controlregarding chimney fires and complaints about DIY domestic heating systems		✓		-	-		Information shared as appropriate		Information shared as appropriate		
	Stoke-on-Trent Low Carbon District Heat Network		✓	Stoke-on-Trent Low Carbon District Heat Network	-	-						

2.3.3 $PM_{2.5}$ in Staffordshire & Stoke-on-Trent - Next steps

As $PM_{2.5}$ is an issue requiring collaboration between the district, county and city authorities within Staffordshire, the following actions are proposed in addition to those outlined in the action plan. Progress on these and the action plan will be detailed in the 2019 ASR.

✓ To agree a target for reducing Fraction of All-Cause Mortality from $PM_{2.5}$ in each district, city and county authority by 2020

✓ To agree a target for reducing $PM_{2.5}$ exposure (calculated from PM_{10} exposure / background maps / local monitoring where available)

✓ To maintain compliance with the 2020 EU limit value of 25µg/m^3

✓ To include Public Health Outcome Framework Indicator 3.01 in the Staffordshire and District Authority and City Council Joint Strategic Needs Assessment for 2018/2019 onwards and to report progress to the relevant Health and Wellbeing Boards.

✓ To continue to identify risks affecting $PM_{2.5}$ which need to be addressed at a national level e.g. a number of authorities within Staffordshire are receiving applications for STOR (Short Term Operating Reserve) sites to supplement power to the National Electricity Grid at times of peak demand. These sites typically operate during the autumn / winter months and can be high emitters of PM.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives. LDC did not undertake any automatic (continuous) monitoring during 2017 or 2018.

3.1.2 Non-Automatic Monitoring Sites

LDC undertook non-automatic (passive) monitoring of NO_2 at 23 sites during 2017 and 2018. Table A.1 in Appendix A outlines the details of the sites.
The monitoring locations include six duplicate sites and one triplicate site as follows:

- A38–2 and A38-2(1);
- A38-2A and A38-2B;
- A38-4A and A38-4B;
- A38-4(X) and A38-4(Y);
- A38-5A and A38-5B;
- A38-A and A38-6B; and
- MUC-1A, MUC-1B and MUC-1C.

Maps showing the location of the monitoring sites are provided in Appendix D. The diffusion tubes have historically been supplied and analysed by Staffordshire Scientific Services utilising the 20% triethanolamine (TEA) in water preparation method. Analysis of the diffusion tubes moved over to Staffordshire Highways Laboratory early in 2018. 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” and corrected for distance. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

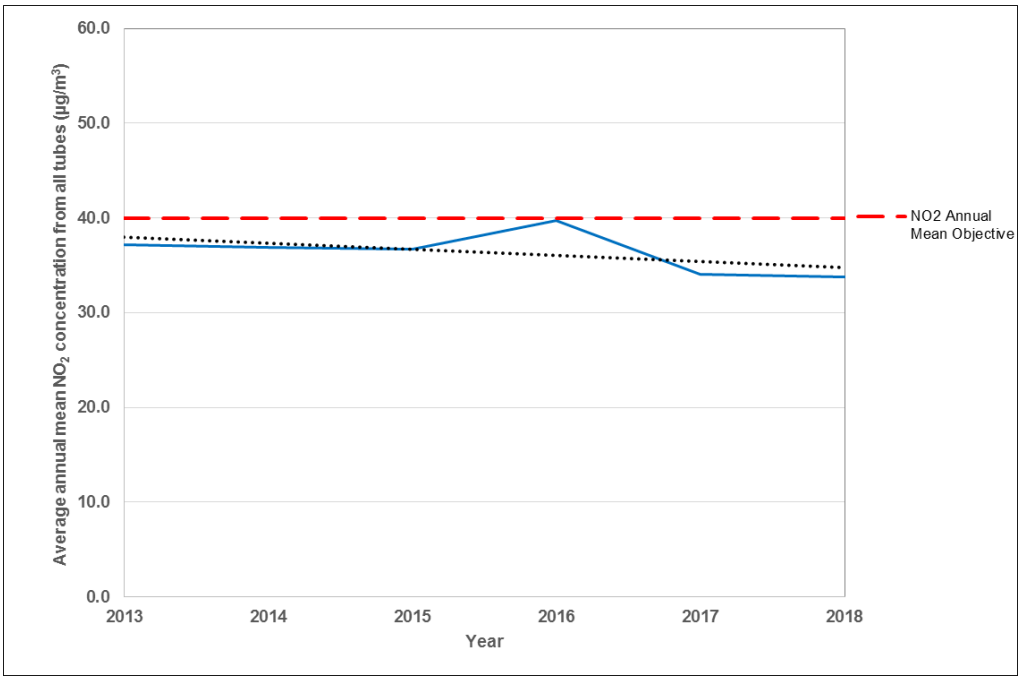
The full 2017 and 2018 dataset of monthly mean values is provided in Appendix B in Tables B.1 and B.2 respectively.

Data capture for 2018 was good (all above 75%), with no established sites requiring short to long term adjustment (annualisation). However, for 2017, one site, B, fell below the 75% data capture criteria (i.e. 67%) therefore annualisation was applied. Full details of the annualisation procedure is provided in Appendix C.

Results for both 2017 and 2018 have been bias adjusted using a national bias adjustment factor of 0.88 and 0.87 respectively. Full details of the bias adjustment and QA/QC procedures are provided in Appendix C.

Figure 3.1 below shows that the average annual mean NO_2 concentration calculated from all 23 diffusion tube sites is below the 40µg/m^3 objective, with a general downward trend in NO_2 concentrations across the whole Lichfield District over the past six years.

Figure 3.1 – Trends in calculated average annual mean NO_2 concentrations from all diffusion tube sites across the District.



Meanwhile trends in NO_2 concentrations for individual sites within the two AQMAs and outside of the AQMAs are shown graphically in Figures 3.2 to 3.4 and discussed below.

A5 Muckley Corner AQMA No. 1

NO_2 concentrations for the seven individual diffusion tube sites within A5 Muckley Corner AQMA are shown in Figure 3.2.

Figure 3.2 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites within the A5 Muckley Corner AQMA.

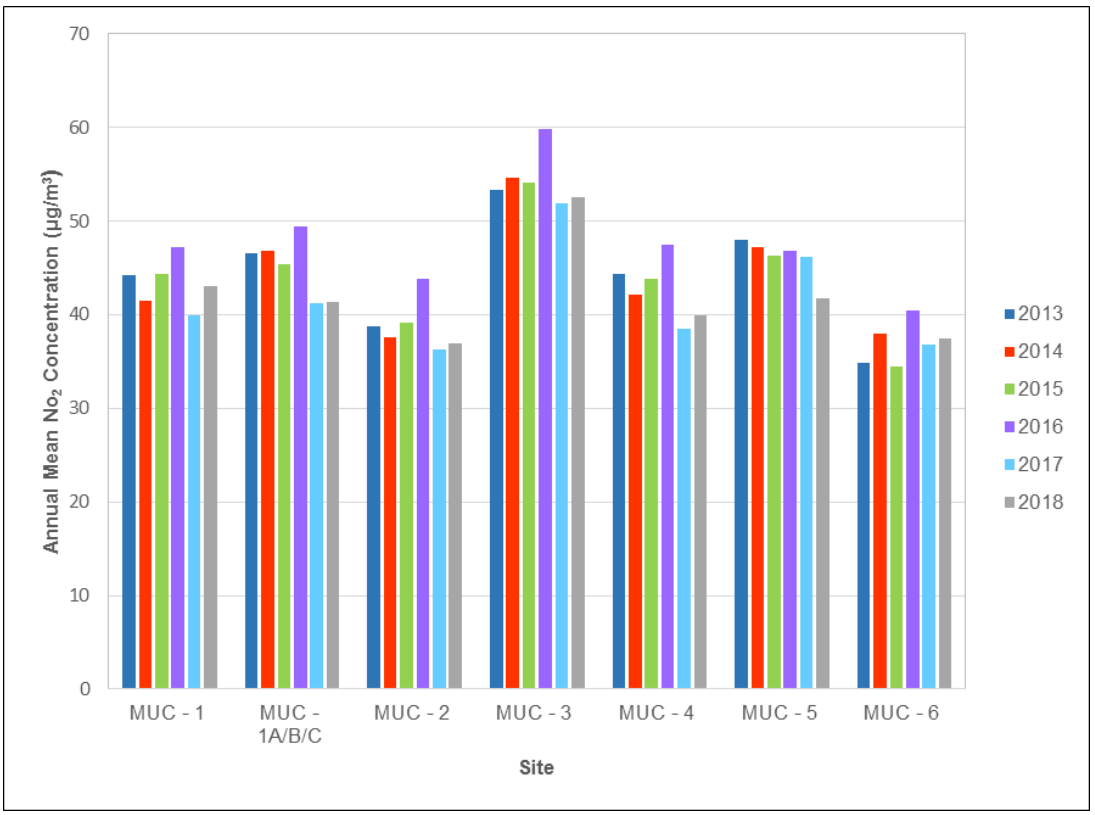


Figure 3.2 shows that within the A5 Muckley Corner AQMA, four of the diffusion tube sites recorded an exceedance of the annual mean NO_2 objective during 2018:

- MUC-1: Muckley Corner Hotel Ground Floor (43µg/m^3);
- MUC-1A/B/C: Muckley Corner Hotel First Floor (41.4µg/m^3);
- MUC-3: Muckley Corner A461 Southbound (52.5µg/m^3); and
- MUC-5: Muckley Corner A5 Eastbound (41.8µg/m^3);

Sites MUC-1 and MUC-A/B/C are located at facades of receptors and therefore represent relevant exposure.

The remaining three diffusion tube sites recorded NO_2 concentrations that dropped below 40µg/m^3 during 2018, but were still within 10% of the annual mean NO_2 objective:

- MUC-2: Muckley Corner A5 Westbound (37µg/m^3);
- MUC-4: Muckley Corner A5 Westbound (39.9µg/m^3);
- MUC-6: Muckley Corner A461 Southbound (37.5µg/m^3).

Of the A5 Muckley Corner AQMA sites highlighted; MUC-2, MUC-3, MUC-4, MUC-5 and MUC-6 were distance corrected to estimate the concentration at relevant exposure (see Figure C.2 and C.3). Site MUC-3 still exceeded the objective at the receptor façade with a reported concentration of 44µg/m^3 (see Table A.2). Sites MUC-2, MUC-4, MUC-5 and MUC-6 met the objective at the receptor façade, however site MUC-6 was within 10% of the NO_2 annual mean objective (See Table A.2).

Despite a small peak during 2016, NO_2 concentrations within the A5 Muckley Corner AQMA have overall declined over the past six years. However, as all sites have shown exceedances in previous years and three are still exceeding; the AQMA continues to be necessary.

With respect to the hourly NO_2 objective, there could be a potential risk of exceedance where the annual mean concentration is greater than 60µg/m^3. Results for the past six years show there are no sites in the A5 Muckley Corner AQMA where the annual mean has been greater than 60µg/m^3; therefore it is unlikely that the hourly mean objective will be exceeded at any of these monitoring sites.

A38 AQMA No. 2

NO_2 concentrations for the individual diffusion tube sites within A38 AQMA are shown in Figure 3.3.

Figure 3.3 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites within the A38 AQMA.

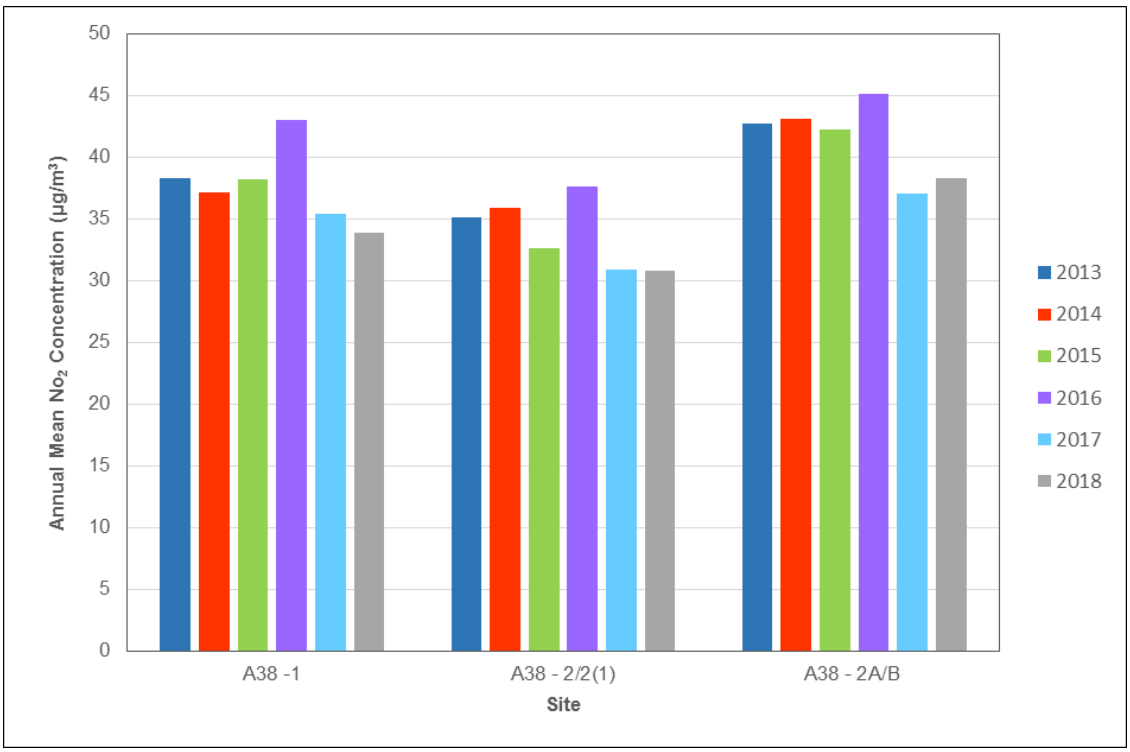


Figure 3.3 shows that all three diffusion tube sites within the A38 AQMA dropped below the annual mean NO_2 objective during 2017 and 2018 following exceedances during previous years:

- A38-1: Alrewas (33.9µg/m^3 during 2018);
- A38/2/2(1): Fradley (30.8µg/m^3 during 2018);
- A38-2A/B: Fradley (38.3µg/m^3 during 2018);

Site A38-1 was distance corrected to estimate the concentration at relevant exposure (see Figure C.2 and C.3) and the reported concentration at the receptor façade was 25.9µg/m^3 during 2018 (see Table A.2). Despite a small peak in NO_2 concentrations during 2016, Figure 3.3 shows an overall downward trend throughout the A38 AQMA. Although NO_2 concentrations are now meeting the objective it is too early to revoke the A38 AQMA due to exceedances of the NO_2 objective prior to 2017 and site A38-2A/B is still within 10% of the objective.

With respect to the hourly NO_2 objective, results for the past six years show there are no sites within the A38 AQMA where the annual mean has been greater than 60µg/m^3; therefore it is unlikely that the hourly mean objective will be exceeded at any of these monitoring sites.

Diffusion tube sites outside of the AQMAs

NO_2 concentrations for diffusion tube sites that are located outside of the AQMAs are shown in Figure 3.4.

Figure 3.4 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites outside of the AQMAs.

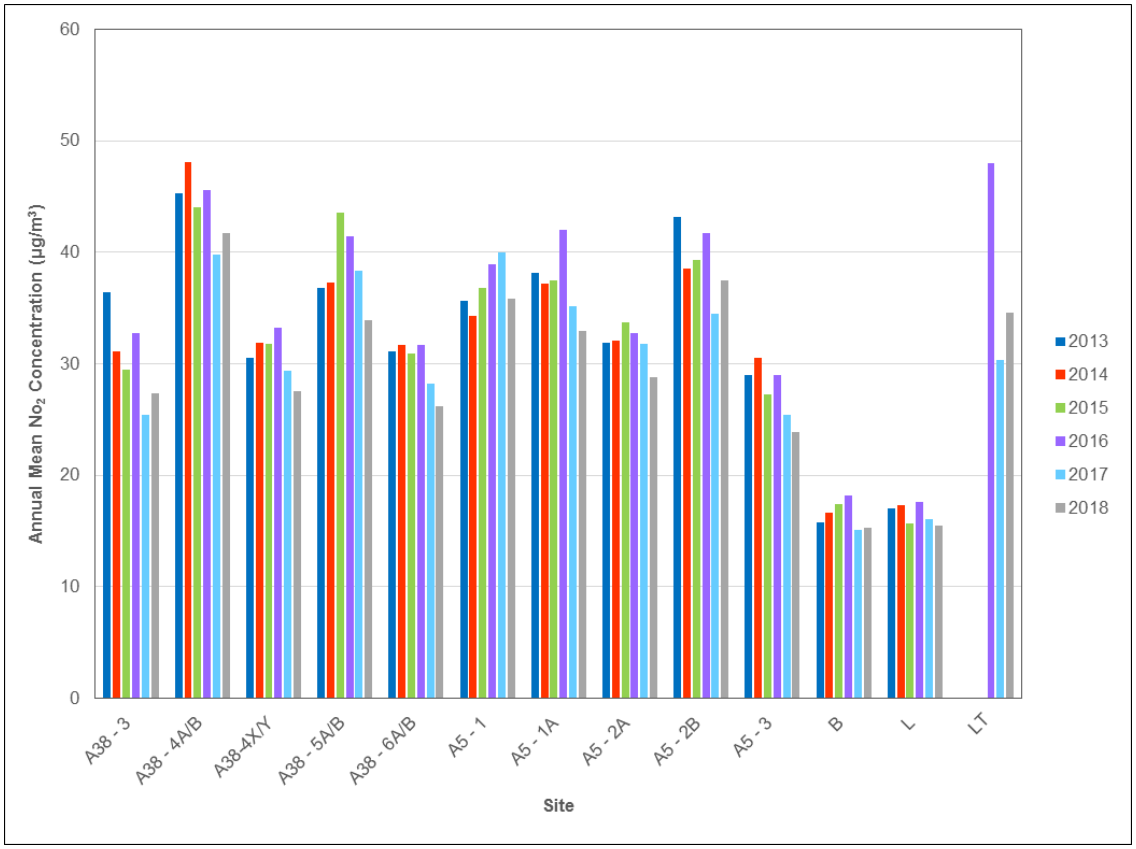


Figure 3.4 shows the trend across the diffusion tube monitoring locations outside the AQMAs within the Lichfield District from 2013 to 2018. The annual mean objective for NO_2 has been met at the majority of locations over the past six years. Meanwhile for the past two years all diffusion tube sites outside of the current AQMAs have met the objective with the exception of site A38-4A/B at Canwell, which recorded a concentration of 41.7µg/m^3.

However, four of the sites outside of the AQMAs, including site A38-4A/B are not located at relevant exposure, therefore distance correction was carried out (see Figure C.2 and C.3). The calculated concentration at a location of relevant exposure (façade of a residential property), fell below the objective at site A38-4A/B with a reported concentration of 38.7µg/m^3 during 2018. Sites A38-5A/B, A5 – 1A and A5 – 2B dropped even further below the objective when distance correction was applied, with reported concentrations of 25.9µg/m^3, 26.5µg/m^3 and 31.8µg/m^3 respectively during 2018 (see Table A.2).

Figure 3.4 indicates that there was an exceedance of the annual mean NO_2 objective at site LT during 2016. However, the results were based on just three months as this particular location was new. This site was added to the network in October 2016 to gather data on potential NO_2 concentrations in relation to future façades of proposed residential properties on the corner of St John Street near Lichfield City Centre. NO_2 concentrations for the full years of 2017 and 2018 met the annual mean NO_2 objective.

With respect to the hourly NO_2 objective, results for the past six years show there are no sites outside of the current AQMAs where the annual mean has been greater than 60µg/m^3; therefore it is unlikely that the hourly mean objective will be exceeded at any of these monitoring sites.

3.2.2 Particulate Matter (PM_{10})

LDC does not monitor for PM_{10}.

3.2.3 Particulate Matter ($PM_{2.5}$)

LDC does not monitor for $PM_{2.5}$.

3.2.4 Sulphur Dioxide (SO_2)

LDC does not monitor for SO_2.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
A38 -1	Alrewas	Roadside	417101	314180	NO_2	YES	9	1	NO	2
A38 - 2/2(1)	Fradley	Roadside	416295	313186	NO_2	YES	10	5	NO	2
A38 - 2A/B	Fradley	Roadside	416290	313175	NO_2	YES	0	6	NO	2
A38 - 3	Lichfield	Roadside	412891	306817	NO_2	NO	6	2	NO	2
A38 - 4A/B	Canwell	Roadside	413978	300834	NO_2	NO	10	6.85	NO	2
A38-4X/Y	Canwell	Roadside	413989	300869	NO_2	NO	0	15	NO	2
A38 - 5A/B	Canwell	Roadside	413950	300574	NO_2	NO	35	10	NO	2
A38 - 6A/B	Canwell	Roadside	413961	300539	NO_2	NO	10	25	NO	2
A5 - 1	Muckley Corner	Roadside	407208	306513	NO_2	NO	>200	4	NO	2
A5 - 1A	Muckley Corner	Roadside	407895	306516	NO_2	NO	6	1	NO	2
A5 - 2A	Muckley Corner	Roadside	408893	306549	NO_2	NO	12	5	NO	2
A5 - 2B	Muckley Corner	Roadside	408667	306500	NO_2	NO	6	2	NO	2
A5 - 3	Lichfield	Roadside	412063	305379	NO_2	NO	13	10	NO	2
B	Burntwood	Urban Background	405086	309344	NO_2	NO	127	N/A	NO	2
L	Lichfield	Urban Background	410544	310760	NO_2	NO	42	N/A	NO	2
MUC - 1	Muckley Corner Hotel Ground Floor	Roadside	408164	306513	NO_2	YES	N/A	5	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
MUC - 1A/B/C	Muckley Corner Hotel First Floor	Roadside	408164	306513	NO_2	YES	0	5	NO	2
MUC - 2	Muckley Corner A5 Westbound	Roadside	408165	306487	NO_2	YES	9	5	NO	2
MUC - 3	Muckley Corner A461 Southbound	Roadside	408097	306468	NO_2	YES	10	5	NO	2
MUC - 4	Muckley Corner A5 Westbound	Roadside	408029	306501	NO_2	YES	2	4	NO	2
MUC - 5	Muckley Corner A5 Eastbound	Roadside	408030	306516	NO_2	YES	5	2	NO	2
MUC - 6	Muckley Corner A461 Southbound	Roadside	408161	306556	NO_2	YES	5	2	NO	2
LT	Lichfield Town	Roadside	411792	309161	NO_2	NO	N/A	N/A	NO	2

Notes:

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

(2) N/A if not applicable.

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)					
					2013	2014	2015	2016	2017	2018
A38 -1	Alrewas	Roadside	100	100	38.3	37.1	38.2	**43.0**	35.4	33.9
A38 - 2/2(1)	Fradley	Roadside	100	100	35.1	35.9	32.6	37.6	30.9	30.8
A38 - 2A/B	Fradley	Roadside	100	100	**42.7**	**43.1**	**42.2**	**45.1**	37	38.3
A38 - 3	Lichfield	Roadside	100	100	36.4	31.1	29.5	32.7	25.4	27.3
A38 - 4A/B	Canwell	Roadside	92	92	**45.3**	**48.1**	**44**	**45.6**	39.8	**41.7**
A38-4X/Y	Canwell	Roadside	92	92	30.5	31.9	31.8	33.2	29.4	27.5
A38 - 5A/B	Canwell	Roadside	100	100	36.8	37.3	**43.5**	**41.4**	38.3	33.9
A38 - 6A/B	Canwell	Roadside	100	100	31.1	31.7	30.9	31.7	28.2	26.2
A5 - 1	Muckley Corner	Roadside	100	100	35.6	34.3	36.8	38.9	**40**	35.8
A5 - 1A	Muckley Corner	Roadside	100	100	38.1	37.2	37.5	**42.0**	35.2	32.9
A5 - 2A	Muckley Corner	Roadside	100	100	31.9	32.1	33.7	32.7	31.8	28.8
A5 - 2B	Muckley Corner	Roadside	92	92	**43.2**	38.5	39.3	**41.7**	34.5	37.5
A5 - 3	Lichfield	Roadside	100	100	29	30.5	27.2	29.0	25.4	23.9
B	Burntwood	Urban Background	100	100	15.8	16.6	17.4	18.2	15.1	15.3
L	Lichfield	Urban Background	92	92	17	17.3	15.7	17.6	16.1	15.5
MUC - 1	Muckley Corner Hotel Ground Floor	Roadside	100	100	**44.2**	**41.5**	**44.4**	**47.2**	**39.9**	**43**
MUC - 1A/B/C	Muckley Corner Hotel First Floor	Roadside	100	100	**46.6**	**46.8**	**45.4**	**49.4**	**41.3**	**41.4**
MUC - 2	Muckley Corner A5 Westbound	Roadside	100	100	38.7	37.6	39.1	**43.9**	36.3	37

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)					
					2013	2014	2015	2016	2017	2018
MUC - 3	Muckley Corner A461 Southbound	Roadside	100	100	**53.3**	**54.6**	**54.1**	**59.9**	**51.9**	**52.5**
MUC - 4	Muckley Corner A5 Westbound	Roadside	100	100	**44.4**	**42.1**	**43.9**	**47.5**	38.5	39.9
MUC - 5	Muckley Corner A5 Eastbound	Roadside	100	100	**48**	**47.2**	**46.3**	**46.8**	**46.2**	**41.8**
MUC - 6	Muckley Corner A461 Southbound	Roadside	100	100	34.9	**38**	34.5	**40.4**	36.8	37.5
LT	Lichfield Town	Roadside	100	100	-	**-**	**-**	**48.0**	30.3	34.6

☒ Diffusion tube data has been bias corrected

☒ Annualisation has been conducted where data capture is <75%

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.**

(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%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2017

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.88) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
LT	I/S	**44.2**	**42.5**	6.7	33.2	29.5	29.3	32.8	I/S	**40.9**	**42.2**	**43.1**	34.4	30.3	-
L	31.4	24.3	21.0	2.6	15.1	12.9	13.2	14.9	17.6	19.2	23.0	23.7	18.2	16.1	-
A38 - 2	**48.3**	**41.9**	**40.2**	11.8	36.5	30.4	27.6	27.2	< 1.0	61.9	32.5	36.7	35.9	31.6	-
A38-2(1)	39.9	**44.7**	**41.8**	14.3	**40.7**	30.4	29.8	26.8	34.6	33.9	34.9	38.8	34.2	30.1	-
A38-2A	**53.4**	**51.5**	**45.8**	4.2	**50.4**	**42.7**	39	39.7	**43.7**	**43.2**	**41.4**	**42.8**	**41.5**	36.5	-
A38-2B	**55.9**	**48.8**	**47.1**	16.3	**47**	**43.2**	39.2	**40.4**	**42.6**	**42.4**	**45.4**	**44.3**	**42.7**	37.6	-
A38 - 1	**50.7**	**46.2**	**42.3**	11.6	35.1	39.4	38.4	**40.9**	38.9	**41.2**	**50.2**	**47.3**	**40.2**	35.4	26.9
A38 - 4 (X)	**40.8**	35.8	34.4	11.6	32	29.5	31.7	35.3	33.3	36.5	39.4	32.5	32.7	28.8	-
A38 - 4 (Y)	**41.9**	34.7	34	17.6	26.1	33.2	32.9	38.5	33.9	36.6	43	36.9	34.1	30.0	-
A38 - 4A	**66**	**52.2**	**41.1**	24.2	**49.7**	I/S	35.7	I/S	**49.3**	**47.6**	**65.3**	**42.7**	**47.4**	**41.7**	37.1
A38 - 4B	**64.6**	I/S	**47.8**	18.9	**48.1**	13.2	**43.5**	**47.5**	I/S	**51.2**	**45.2**	**50.8**	**43.1**	37.9	
A38 - 5A	**61.2**	**44.9**	**46**	23.6	34.9	39.7	38.5	**44.9**	**45**	**51.1**	**59.2**	**53.5**	**45.2**	39.8	28.5
A38 - 5B	**45.9**	**45.2**	**41.1**	16	36.8	**43.4**	**40.1**	**49.2**	**41.1**	**49.1**	**58.2**	36	**41.8**	36.8	
A38 - 6A	34	39.8	36.5	27.2	26	31	31.2	35.6	30.6	2.1	39.8	34.3	30.7	27.0	
A38 - 6B	**40.3**	35.5	35.1	20.6	26.8	29.9	30.1	33.8	33.8	36.5	**40**	39.8	33.5	29.5	

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.88) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
A38 - 3	39.6	28.9	31.1	17	36.8	25.3	27.1	26.6	27.8	25.7	30.9	25	28.5	25.1	
A5 - 3	**40.9**	33.1	31.2	16.7	27.2	23.9	26.2	27.7	26.3	27.6	36.6	28.9	28.9	25.4	
A5 - 2B	**51.3**	**41.8**	**41.8**	16.5	37.8	**41.3**	38.9	**40.6**	38.2	39	**44.9**	38.1	39.2	34.5	29.7
MUC - 6	**61.5**	**58.3**	**51.6**	23.2	**40.5**	39.7	38	**42.9**	38.5	**41.2**	17.4	**49.6**	**41.9**	36.8	32.4
MUC - 1A	**53.2**	**54.4**	**54.1**	36.4	**44.9**	**52.6**	**47.9**	**48.3**	**41.6**	**48.9**	**44.3**	**50.3**	**48.1**	**42.3**	
MUC - 1B	**I/S**	I/S	**56.9**	22.1	**53.9**	I/S	**48.3**	48	**52.9**	**53.4**	**42.7**	**45**	**47.0**	**41.4**	
MUC - 1C	**53.4**	**48.4**	**51.3**	20.1	**58.2**	**64.7**	**46.6**	**42.8**	**46.8**	39.7	**48.1**	**42.5**	**46.9**	**41.3**	
MUC - 1	**48.7**	**50.9**	**49.4**	17.6	**54.2**	**46.8**	**44.3**	**46.2**	**47.4**	**46**	**44.8**	**47.9**	**45.4**	39.9	
MUC - 2	**52.3**	39.3	**46.1**	15.1	**47.8**	**45.6**	38.7	I/S	36	**44.9**	**48**	39.8	**41.2**	36.3	32.8
MUC - 3	**61.6**	**68.1**	**63**	25.6	**67.3**	**64.9**	I/S	**58.1**	**67.9**	**60.2**	**67.6**	**44.9**	**59.0**	51.9	**44.5**
MUC - 4	**59.5**	I/S	**46.9**	I/S	**53.5**	37.8	**41.6**	38.1	38.5	38.6	**44.1**	38.6	**43.7**	38.5	34.9
A5 - 1A	**54.5**	**47.1**	**45.7**	12.7	39.9	38.4	36.4	37.1	**42.6**	**44.5**	**44**	36.5	**40.0**	35.2	28.2
MUC - 5	**60.9**	I/S	**55.2**	23.8	**54.4**	**57.8**	**46.5**	**52.1**	**55.2**	**55.1**	**68.9**	**48.2**	**52.6**	**46.2**	39.8
A5 - 2A	**50.8**	**44.9**	36.8	9.2	34	32.1	28.8	36.2	33.5	**42**	**44.3**	**41.3**	36.2	31.8	
A5 - 1	**69.2**	**56.6**	**48.6**	15.1	**44.1**	**41.1**	**40.4**	**40.4**	39.8	**45.5**	**52.4**	**52.5**	**45.5**	**40.0**	
B	33.1	23.7	19.8	4.7	14.7	I/S	12.2	14.8	I/S	18.5	I/S	I/S	17.7	15.1	

☒ Local bias adjustment factor used

☒ National bias adjustment factor used

☒ Annualisation has been conducted where data capture is <75%

☒ Where applicable, data has been distance corrected for relevant exposure

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.**

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

Table B.2 – NO_2 Monthly Diffusion Tube Results - 2018

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
LT	46.5	44.6	39.3	26.7	39.5	42.7	40.9	31.8	37.7	44.5	41.7	41.5	39.8	34.6	
L	25.8	20.8	17.9	16.3	13.1	11.2	13.7	15.2	15.9	21.6	I/S	25.1	17.9	15.5	
A38 - 2	41.5	40.9	39.4	40.3	41	34.5	31.5	28.3	28.4	33.6	41.3	40.2	36.7	32.0	
A38-2(1)	40.9	37.5	32.3	41.2	41.4	33.8	30.5	27.9	30.4	26.9	31.7	34.2	34.1	29.6	
A38-2A	47	47.5	44.8	50.2	47.4	44.4	41.8	37.2	39.1	42.9	46.7	36.5	43.8	38.1	
A38-2B	47	46.8	43.4	45.6	46	50.1	43.7	34.8	39.8	45.3	43.9	44.1	44.2	38.5	
A38 - 1	47.7	42.3	34.6	37.1	35	36.2	36.9	40.5	41.2	41	35.9	39.5	39.0	33.9	25.9
A38 - 4 (X)	36	33.2	33	30.6	I/S	24.2	30.2	30.7	33	36.2	28	28.8	31.3	27.2	
A38 - 4 (Y)	37.2	34.6	31.6	28.6	30.6	23.6	30.8	32.6	30.5	38.1	31	34.2	32.0	27.8	
A38 - 4A	I/S	56.1	48.5	46.1	50.9	45.2	56.4	52	34.4	52	40.5	50	48.4	**42.1**	38.7
A38 - 4B	54.6	52.2	45.2	50.7	46.1	43.6	52	48.6	43.4	43.9	35.8	54.1	47.5	**41.3**	
A38 - 5A	44.9	45.4	37.1	38.1	25.3	29.7	42	40	40.1	45.8	33.9	43.5	38.8	33.8	25.9
A38 - 5B	45.8	41	40.6	33.1	30.4	31.9	44.9	44.1	40	43	32.2	41.6	39.1	34.0	
A38 - 6A	34.5	30.1	34.3	26.8	22.5	19.8	26.9	32.8	26.7	34	27.1	34.9	29.2	25.4	
A38 - 6B	41.5	33.2	31.1	27.8	22.8	18.7	30.6	35.3	35	33.1	28.3	36	31.1	27.1	
A38 - 3	30.6	41.4	35.8	37.3	37.1	33.1	27.1	23	19.7	31.9	27.4	32.3	31.4	27.3	
A5 - 3	13.6	35.9	32.4	28.2	30.6	28.4	27.5	26.1	25.4	30.5	15.7	35.3	27.5	23.9	

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
A5 - 2B	45.7	45.3	37	37.4	46.6	44.3	41.9	42.5	42.7	49.8	I/S	41	43.1	37.5	31.8
MUC - 6	70.5	51.1	45.5	46.7	I/S	27.3	38.4	33.5	34.6	44.5	38.1	43.9	43.1	37.5	32.8
MUC - 1A	50.2	48.2	48.1	48.2	55	55.1	50.7	40.5	41.8	46.8	41.4	43.8	47.5	**41.3**	
MUC - 1B	52.2	50.5	50	59.4	55.1	57.4	55.1	39.7	44.3	45.6	36.8	51.1	49.8	**43.3**	
MUC - 1C	45.9	47.5	52.1	52.9	56.2	53.2	51.7	41.4	38.7	44.9	40.8	45.6	47.6	**41.4**	
MUC - 1	50.5	48.5	52.9	49.4	65.1	59.5	51.4	38.4	42	45.8	44.3	45.2	49.4	**43.0**	
MUC - 2	44.1	49	44.5	41.3	46.5	46	45.3	37.4	40.5	43.9	29.6	42.4	42.5	37.0	33.2
MUC - 3	64.9	63.1	57.9	60.9	47.4	60.9	70.1	64.4	58.1	66.5	54.7	55.3	60.4	**52.5**	**44.9**
MUC - 4	45.9	51	51.8	50.4	51.3	43.8	44.5	41.4	32.3	46.9	40.6	49.9	45.8	39.9	35.9
A5 - 1A	47	38	40.9	35.2	33.7	27.7	33.9	37.6	38.3	38	39	43.9	37.8	32.9	26.5
MUC - 5	46.5	46.8	45.3	43.8	47.1	38.7	52.3	54	58.9	44.9	47.3	51.4	48.1	**41.8**	36.2
A5 - 2A	43.6	34.2	33.4	30.4	26.4	20.4	30.6	33	35.6	35.6	33.8	40.7	33.1	28.8	
A5 - 1	53.2	39	46.1	40.7	32	32.4	39.9	48	37	37.2	38.8	49.9	41.2	35.8	
B	22.8	22.5	18.6	14.5	12.2	10.4	12.4	14.2	15.6	20	20.8	26.6	17.6	15.3	

☐ Local bias adjustment factor used

☒ National bias adjustment factor used

☐ Annualisation has been conducted where data capture is <75%

☒ Where applicable, data has been distance corrected for relevant exposure

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.**

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tube Bias Adjustment Factors

The diffusion tubes have historically been supplied and analysed by Staffordshire Scientific Services utilising the 20% triethanolamine (TEA) in water preparation method. However, the analysis service moved over to Staffordshire Highways Laboratory early in 2018.

As there are no automatic monitoring stations within the Lichfield District, a local bias adjustment factor has not been calculated. A bias adjustment of 0.88 for the year 2017 based on 19 studies and a factor of 0.87 for the year 2018 based on 13 studies; were obtained from the national bias adjustment calculator. National bias adjustment factors were also used in the previous years.

For previous years 2013 to 2016, the bias adjustment factors were taken from the Council's previous LAQM annual reports. The factors used were 0.87 (2013), 0.83 (2014), 0.85 (2015) and 0.91 (2016).

Short to Long Term Adjustment

There were no monitoring sites requiring annualisation in 2018. However, site B was adjusted for the 2017 data year due to data capture being 67%, which is less than the 75% threshold considered appropriate for a valid result. Annualisation of the 2017 results for site B was undertaken using the method set out in Box 7.10 of LAQM.TG (16). Box 7.10 states that a nearby continuous background site (B1) should be used TO annualise DT data when data capture is <75%. However LDC does not have any continuous background sites. Box 7.10 states that diffusion tube sites with 12 months data may be used instead. The only other background DT site in LDC is site L, but data capture for this site during 2017 was 92% therefore a background DT site in the neighbouring authority; Cannock Chase District Council (CCDC) was used to correct for short term data. The site used from CCDC was Deavall's Farm, Hawks Green (DT DF), 399688,310688. The data used to annualise site B is outlined in Table C.1 below

Table C.1 – Annualisation for Site DT B

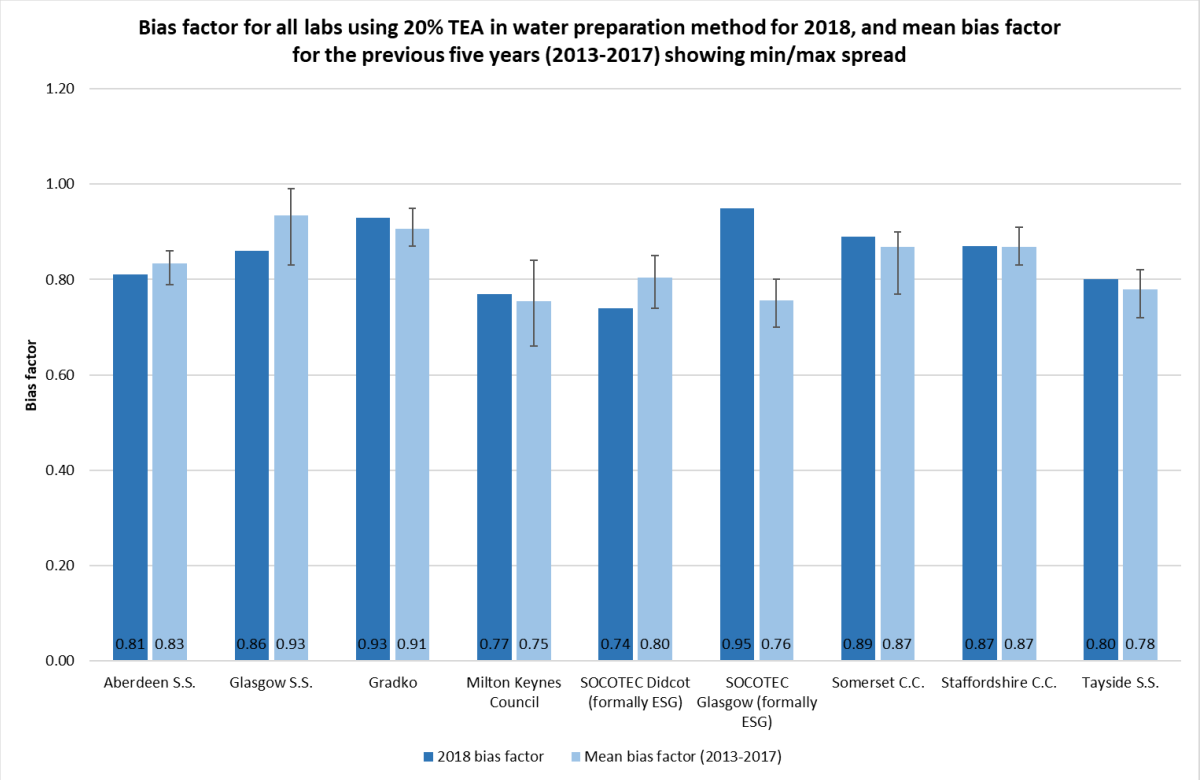
Start Date	End Date	B1	D1	B1 when D1 is available
04.01.2017	01.02.2017	30.7	33.1	30.7
01.02.2017	01.03.2017	25.3	23.7	25.3
01.03.2017	29.03.2017	22.2	19.8	22.2
29.03.2017	26.04.2017	6.4	4.7	6.4
26.04.2017	31.05.2017	13.1	14.7	13.1
31.05.2017	28.06.2017	13.5		
28.06.2017	02.08.2017	13.9	12.2	13.9
02.08.2017	30.08.2017	15.6	14.8	15.6
30.08.2017	27.09.2017	18.7		
27.09.2017	01.11.2017	22.3	18.5	22.3
01.11.2017	06.12.2017	23.5		
06.12.2017	03.01.2017	26.4		
Average		19.3	17.69	18.6875
Ratio (Am/Pm)		0.97		
Measured period mean x Ratio		17.69 x 0.97		
Annualised Value for Site DT B		**17.16**		
Bias Adjusted		**15.10**		

QA/QC of Diffusion Tube Monitoring

Staffordshire Scientific Services/ Staffordshire Highways Laboratory is a UKAS accredited laboratory and participates in the in the new AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The laboratory follows the procedures set out in the Harmonisation Practical Guidance. In 2018, the laboratory scored 50% in AIR-PT round AR 024 (January to February 2018) and 100% for rounds AR025 to AR028 (from April to October 2018). The percentage score reflects the results deemed to be satisfactory based upon the z- score of < ± 2. The laboratory also takes part in the field inter-comparison scheme. Based on 13 diffusion tube studies, all local authority co-location studies in 2018 were rated as 'Good' (tubes are considered to have "satisfactory" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

The overall bias factor for Staffordshire Highways Laboratory for 2018 (including the Field Inter-comparison result and all the co-location results from participating local authorities, total of 13 studies) was 0.87. Figure C.1 shows this factor compares well with other participating laboratories using the same method (20% TEA in water). Figure C.1 also shows the 2018 bias factor of 0.87 is comparable to the mean bias factor for Staffordshire for the previous 5 years. It also shows the spread of the bias factor which for Staffordshire (min 0.83 and max 0.91) demonstrates good consistency of the laboratory bias.

Figure C.1 – Bias factor for all laboratories using 20% TEA in water – 2018



Distance Correction

Where diffusion tubes were not sited at locations representative of receptor locations (i.e. Residential properties in the case of the annual mean NO_2 objective) then the distance correction tool at https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html was used. The calculations are shown in Table C.2 for 2017 and Table C.3 for 2018.

Table C.2 – NO_2 Fall-off with distance calculator – 2017

Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
A38-1	1.0	9.0	16.3	35.4	28.9	
A38 4A,B	6.9	10.0	17.6	39.8	37.1	Predicted concentration at Receptor within 10% the AQS objective.
A38-5A,B	10.0	32.0	17.6	38.3	28.5	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
A5 2B	2.0	6.0	15.9	34.5	29.7	
MUC-6	2.0	5.0	16.2	36.8	32.4	
MUC-2	5.0	9.0	16.2	36.3	32.8	
MUC-3	5.0	10.0	16.2	51.9	44.5	Predicted concentration at Receptor above AQS objective.
MUC-4	2.0	4.0	16.2	36.5	34.9	
MUC-5	2.0	5.0	16.2	46.2	39.8	Predicted concentration at Receptor within 10% the AQS objective.
A5 1A	1.0	6.0	15.9	35.2	28.2	

Table C.3 – NO_2 Fall-off with distance calculator – 2018

Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
A38-1	1.0	9.0	15.8	33.9	25.9	
A38 4A/B	6.9	10.0	16.9	41.7	*38.7*	Predicted concentration at Receptor within 10% the AQS objective.
A38-5A/B	10.0	35.0	16.9	33.9	25.9	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
A5 2B	2.0	6.0	15.2	37.5	31.8	
MUC-6	2.0	5.0	15.5	37.5	32.8	
MUC-2	5.0	9.0	15.5	37.0	33.2	
MUC-3	5.0	10.0	15.5	52.5	**44.9**	Predicted concentration at Receptor above AQS objective.
MUC-4	2.0	4.0	15.5	39.9	35.9	
MUC-5	2.0	5.0	15.5	41.8	*36.2*	Predicted concentration at Receptor within 10% the AQS objective.
A5 1A	1.0	6.0	15.2	32.9	26.5	

Table C.4 – Previous Air Quality Action Plan Measures (First Draft of AQAP)

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Ecostars	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Lichfield DC and supporting Third Party	N/a	On-going	Reduction in fuel consumption & emissions	<tbc after quantitative appraisal>	On-going	On-going	http://www.ecostars-uk.com/
2	Increase the volume of through traffic using M6 Toll	Traffic Management	UTC, Congestion management, traffic reduction	M6 Toll operators and Lichfield DC	Planning	Not yet commenced	Reduction in HGV % in AQMAs	<tbc after quantitative appraisal>	Preliminary discussion with Highways England	2020	Subject to Highways England engagement
3	Upgrading Trunk A-Roads to Expressways	Traffic Management	UTC, Congestion management, traffic reduction	Highways England and Lichfield DC	Planning	Not yet commenced	Reduction in traffic congestion	<tbc after quantitative appraisal>	Preliminary discussion with Highways England	2020	Subject to Highways England engagement
4	Improvement of A38 through UTMC	Traffic Management	Strategic highway improvements	Lichfield DC	On-going	On-going	Implementing UTMC	Contribute toward 40.3% and 25.0% reductions required respectively	On-going	On-going	Impacts both Muckley Corner and Fradley AQMAs
5	Freight Quality Partnership / Ban on HGVs in AQMA during Peak Periods	Freight and Delivery Management	Delivery and Service plans	Lichfield DC	2017/18	2018-2022	HGV #s in peak hours	Reducing emissions contribution from HGVs	Planning Phase	On-going	Discuss with members of EcoStars for best possible solution
6	Freight Consolidation Centre	Freight and Delivery Management	Freight Consolidation Centre	Lichfield DC	2017/18	2018-2022	HGV # usage	Reducing emissions contribution from HGVs	Planning Phase	On-going	Investigate other FCC programmes in first instance
7	Encouraging Modal Shift	Promoting Travel Alternatives	Other	Lichfield DC	2017	2018-2022	Reduction in overall AADT	Proportionate to achieved vehicle reduction	Planning Phase	On-going	Must be a Council-wide initiative

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
8	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles and EV recharging	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Lichfield DC/OLEV	2017/18	2018-2022	# Charging Points Installed	Reducing emissions contribution from cars	Planning Phase	2022	Consider OLEV or AQ grant application funding
9	Bus Fleet Upgrades	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	Lichfield DC and Staffordshire CC	2017/18	2018-2022	# Low/Zero Emission Buses Procured	Reducing emissions contribution from buses (and in turn cars if bus service uptake improves)	Planning Phase	2022	Consider OLEV or AQ grant application funding
10	Reduction in Idling Traffic	Traffic Management	Anti-idling enforcement	Lichfield DC	2017	2018-2022	Installation of signage	Reducing idling emissions from all vehicles	Planning Phase	2018	Consider options for enforcement (volunteers, penalties?)
11	Improvements to Lichfield Trent Valley rail station	Promoting Travel Alternatives	Promote use of rail and inland waterways	Network Rail/ London Midland/ DfT	2016 - Completed	2017	Train usage footfall increase	Indirect	Construction On-going	End 2017	Led by Network Rail/London Midland and DfT funded
12	Pollution abatement equipment for HGVs	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Lichfield DC/OLEV	2017/18	2018-2022	# vehicles retrofitted	Reducing emissions contribution from HGVs	Planning Phase	2022	Consider OLEV or AQ grant application funding
13	Replacing older vehicles	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	Lichfield DC/OLEV	2017/18	2018-2022	# vehicles replaced (in addition to normal fleet turnover)	Reducing emissions from all council owned vehicles	Planning Phase	On-going	Consider OLEV or AQ grant application funding
14	Travel planning amongst LDC employees	Promoting Travel Alternatives	Workplace Travel Planning	Lichfield DC	2017	2018-2022	Implementing travel plan by end 2018	Reducing emissions from LDC employees	Planning Phase	2019	Requires employee education and engagement

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
15	Education Initiatives	Public Information	Other	Lichfield DC	2017/18	2018-2022	Implementing campaign by end 2018	Through public awareness	Planning Phase	2019	Requires employee education to inform public correctly
16	Real-time AQ information	Public Information	Other	Lichfield DC	2017/18	2018-2022	Installation across district by end 2018	Through public awareness	Planning Phase	2019	Investment required unclear. Consider AQ grant funding application
17	Staffordshire Air Quality Forum	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	County-wide	Completed	On-going	Full LA engagement across the group + Regular Meetings	N/a	On-going	On-going	Partnership to continue indefinitely
18	Use the planning regime to minimise impact of new developments on AQMAs	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Lichfield DC/ Staffordshire Air Quality Forum	On-going	On-going	Implementing Supplementary planning Guidance	By restricting emissions + impact of new development	On-going, discussions around partnership joint guidance to follow	2018/2019	Requires buy in from other Staffordshire Authorities
19	Inspect under the Environmental Permit regime and enforce legislation to reduce combustion processes	Environmental Permits	Introduction/increase of environment charges through permit systems and economic instruments	Lichfield DC	Completed	On-going	Installations adhering to permits and enforcement/penalties for breaches	By restricting emissions from industrial processes	On-going	Continual	Requires employee education and engagement
20	Air quality monitoring	Public Information	Other	Lichfield DC/Defra	On-going	On-going	# monitoring locations and On-time submittal of ASRs	Through EHO/public awareness	On-going annually	Annual	Possibly liaise with Defra regarding need for additional monitoring and/or AURN funding. Consider continuous monitoring and AQ grant application

New Developments

HS_2 update

High Speed Two (HS_2) is a planned high-speed railway in the United Kingdom linking London, Birmingham, the East Midlands, Leeds, Sheffield and Manchester. It would be the second high-speed rail line in Britain, after High Speed 1 (HS_1) which connects London to the Channel Tunnel.

Phase One is a north westerly route that will link London Euston to the West Midlands with a connection onto the West Coast Mainland at Handsacre in the Lichfield District, thereby taking services to the North West of England and Scotland. Phase One of HS_2 will pass through the parishes of Hints, Weeford, Swinfen and Packington, Whittington, Fradley and Streethay, and Kings Bromley within the Lichfield District.

The first part of the construction for Phase One, the enabling works (i.e. archaeology, utilities diversions, early planting etc.) has already commenced. The main civil engineering works are due to commence during summer 2019, in pursuit of the line opening to passengers in 2026.

An Air Quality Strategy for Phase One[7] has been produced setting out how HS_2 Ltd, its nominated undertakers and contractors will meet Environmental Requirements set out in the Code of Construction Practice (CoCP)[8] to protect the environment and minimise the impact on air quality. At a local level, site specific control measures have been included within Local Environmental Management Plans (LEMPs). The LEMP for the Lichfield District[9] was published in December 2017, taking into account the findings of the main Environmental Statement (ES), supplementary statements and builds on the general environmental requirements set out in the CoCP.

[7] High Speed Two Air Quality Strategy, High Speed Two (HS_2) Limited, July 2017
[8] High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 1: Code of Construction Practice, High Speed Two (HS_2) Limited, February 2017
[9] High Speed Rail (London-West Midlands) Local Environmental Management Plan Lichfield District Council, High Speed Two (HS_2) Limited, December 2017

Contracts for both the enabling works and main civil engineering works have now been awarded. The awarded contractors will be required under the LEMP to manage dust, air pollution, odour and exhaust emissions during the construction works in accordance with Best Practicable Means (BPM) taking into account current guidance on 'best practice[10,11]. Specific locations with relevant receptors that should be considered in the contractor's working methods and locations considered in relation to construction traffic exhaust emissions have been identified and our outlined in the LEMP. The locations to be explicitly considered in the Contractor's working methods were assessed to have a low to high risk of dust impacts without mitigation measures. However HS_2 have made a commitment within the Lichfield LEMP to employ all relevant dust mitigation measures outlined in the CoCP and any site specific measures as deemed necessary. Measures include; planning the site layout, provision of dust suppression, measures to keep roads, accesses and vehicles clean, shielding or provision of filters on plant likely to generate excessive dust beyond site boundaries. Locations identified where construction traffic exhaust emission impacts are likely were reported by HS_2 in the Lichfield LEMP to have negligible impact, but they will remain under review throughout the construction process.

HS_2 has also set emission requirements and targets for the engines of contractor cars, vans and HGVs for the whole route and have been categorised as London Low Emission Zone, Clean Air Zone and Rest of Route. Lichfield is within the Rest of Route category and therefore the requirements applicable to Lichfield are for HGVs to be powered by Euro VI (or lower) engines from the onset of works commencing and for cars and vans to be Euro 6 diesel and Euro 4 petrol from 2020. There are also targets for the use of Ultra Low Emission Vehicles. For Non-Road Mobile Machinery (NRMM) there is a requirement for Euro Stage IIIB from 2017 and for Euro Stage IV from 2020. Further details on the emission standards are set out in HS_2 information Paper E_{31}: Air Quality[12].

An inspection and monitoring programme to assess the effectiveness of mitigation measures set out in the CoCP and LEMP will be implemented by the contractors. Specific locations for dust monitoring are yet to be decided by HS_2, but once agreed monthly monitoring reports will be made publically available.

[10] Guidance on the assessment of dust from construction and demolition: Institute of Air Quality Management, February 2014
[11] Air Quality Monitoring in the Vicinity of Demolition and Construction Sites: Institute of Air Quality Management, October 2018
[12] High Speed Two: Phase One Information Paper, E_{31}: Air Quality, February 2017

On the 30th November 2015, the chancellor confirmed the route from the West Midlands to Crewe referred to as Phase 2a. It is anticipated that Phase 2a will open in 2027, six years ahead of the remainder of Phase 2. Phase 2a is subject to its own Hybrid Bill, which was deposited in Parliament on 17 July 2017. This Bill seeks powers to build the route from the West Midlands through Staffordshire to Crewe. As part of this a full Environmental Statement (ES) was produced. A ten week consultation period followed from this and closed on 30th September 2017. LDC submitted a joint response with the County Council, Stafford Borough Council and Newcastle-under-Lyme Borough Council. The Bill received its second reading in the House of Commons on 30th January 2018, which triggered a petitioning period that ran until 26th February 2018. LDC along with the County Council petitioned on a range of matters, namely concerns regarding the impact of construction traffic using the existing network in the District, particularly as there will be an overlap in civil engineering works for both Phase One and Phase 2a. Since then the Department for Transport (DfT) have deposited two additional provisions (AP1) and (AP2) to the Bill. LDC together with its partners have made further representations which are currently ongoing. It is anticipated the Bill will receive Royal Assent at the end of 2019.

Integrated Transport Strategy (ITS) – Summary of Progress

2017/18 schemes

B5014 Uttoxeter Rd, Hill Ridware – pedestrian facility

A5192 Eastern Avenue/Grange Lane junction improvement – assessment (ongoing project)

Alrewas to NMA cycle route phase 2 – investigation and design work (included in HLF successful bid for delivery 2020-21)

Walk/cycle links Burntwood to Chasewater

Lichfield Southern Bypass – outline business case (ongoing)

Traffic Management Market Square, Lichfield – investigations

A5127 Sustainable Transport Corridor Lichfield – identification and design work (ongoing)

A5127, Lichfield junction improvements – design work (now at delivery)

Burntwood Town Centre – public realm enhancements – design work (ongoing)

2018/19 Schemes

A5127 junction improvements, Lichfield – junction modifications to reduce congestion and delay as well as provide improved cycle and walk facilities (ongoing)

Burntwood TC public realm – sustainable transport enhancements in town centre including potential local directional signing strategy and junction modifications (ongoing)

HS_2 phase 1 cycling and safety schemes in Lichfield – review of specific corridors and accident cluster analysis (ongoing)

Lichfield Trent Valley rail station – station access and car park layout review including pedestrian and cycle access (ongoing)

2019/20 New Schemes

Cappers Lane/Trent Valley Road/Eastern Avenue junction improvement, Lichfield – capacity improvements and new pedestrian facilities – assessment stage

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

Figure D.1 – AQMA No.1 A5 Muckley Corner & Monitoring Locations

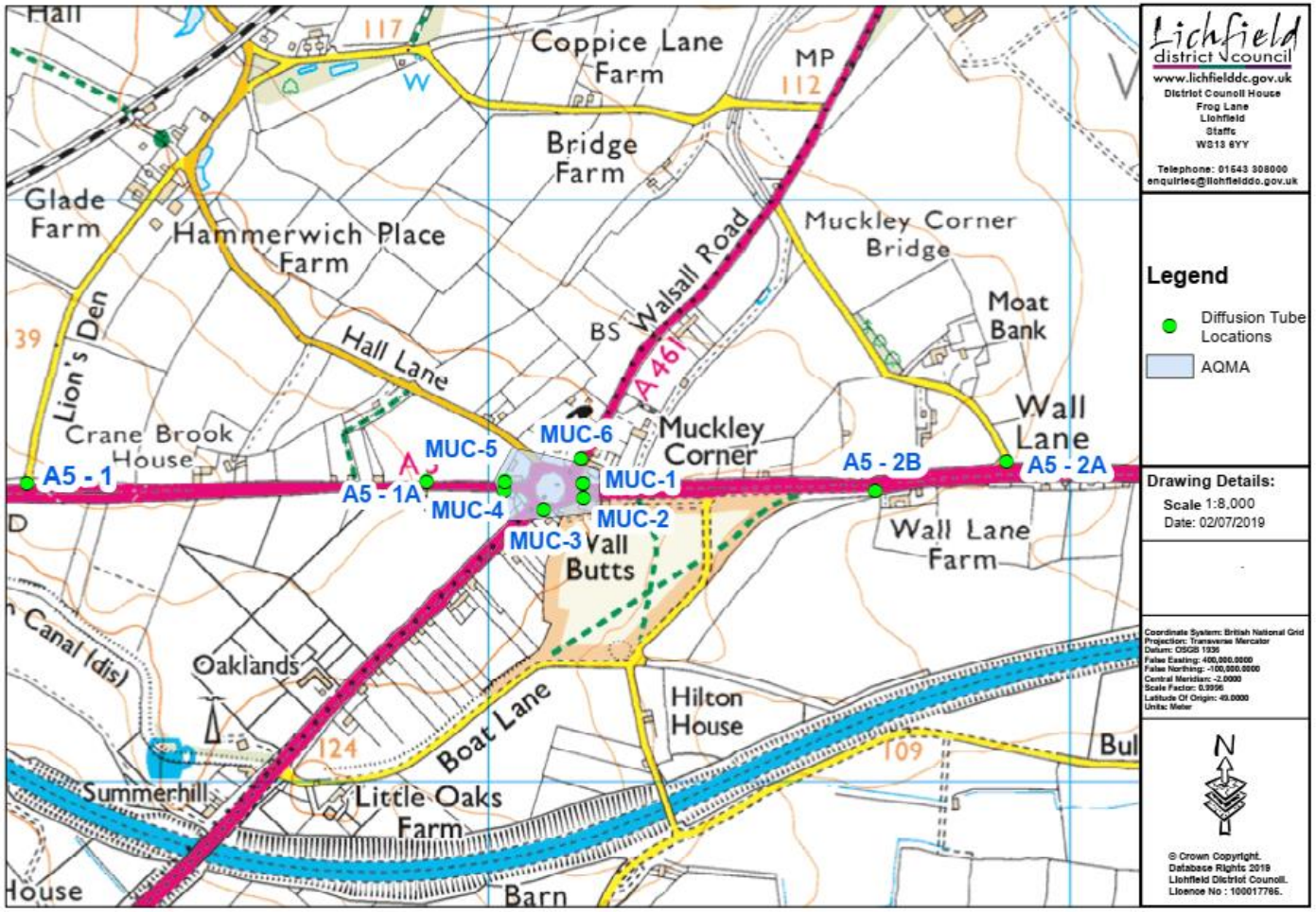


Figure D.2 – AQMA No.2 A38 Streethay to Alrewas & Monitoring Locations

Figure D.3 – Monitoring Locations Outside of AQMAs - Swinfen

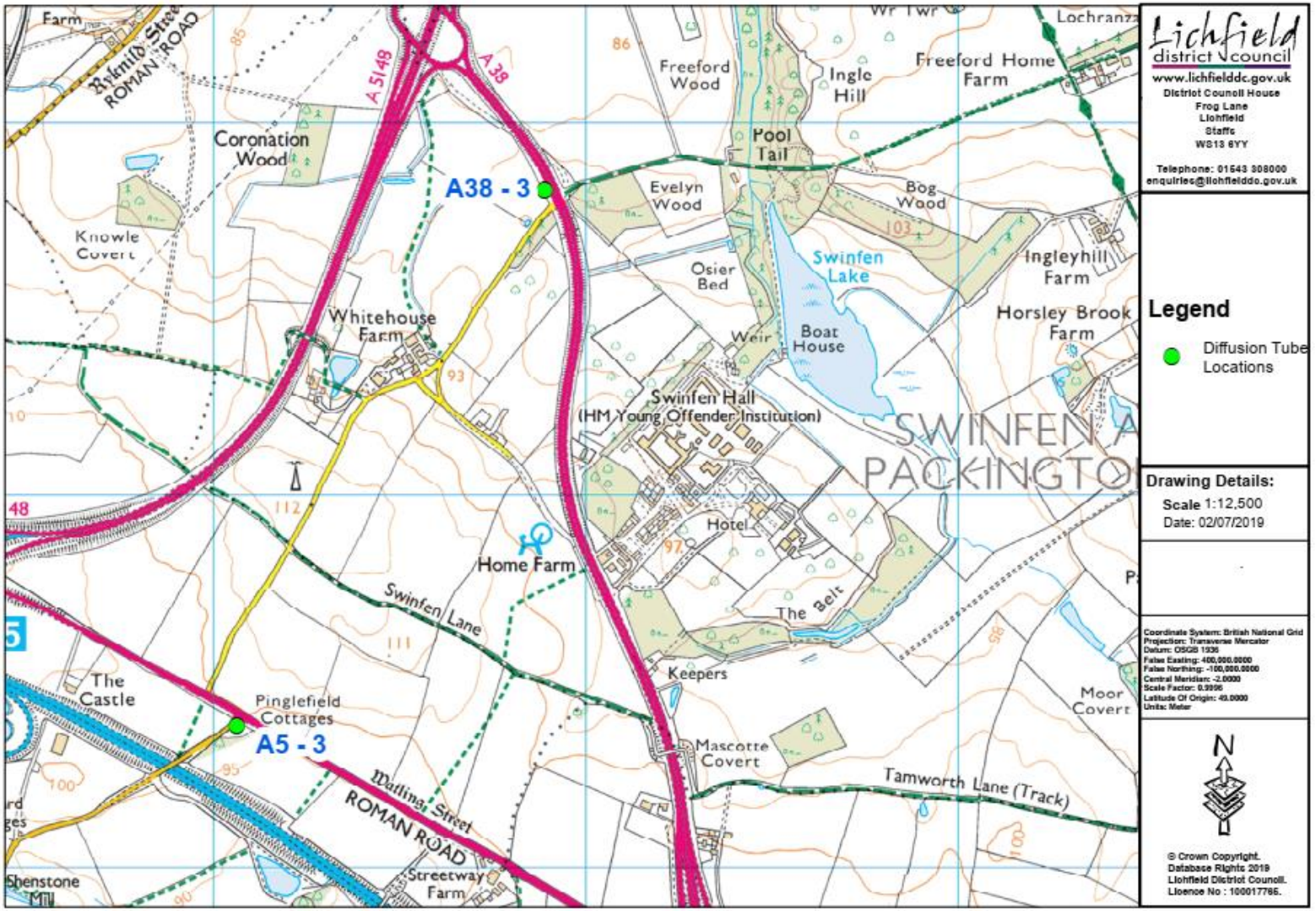


Figure D.4 – Monitoring Locations Outside of AQMAs – A38 Canwell

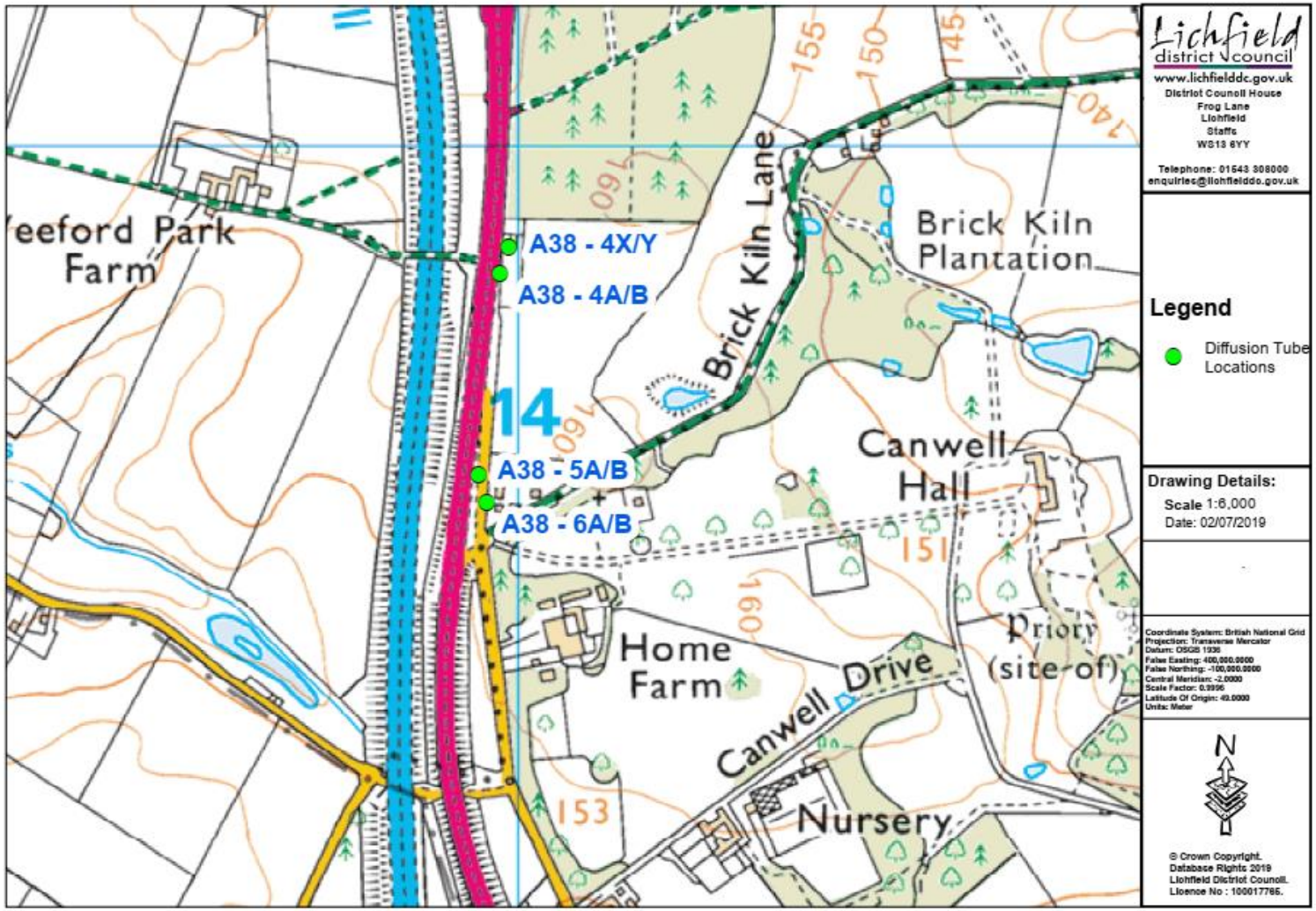


Figure D.5 – Monitoring Locations Outside of AQMAs – Lichfield

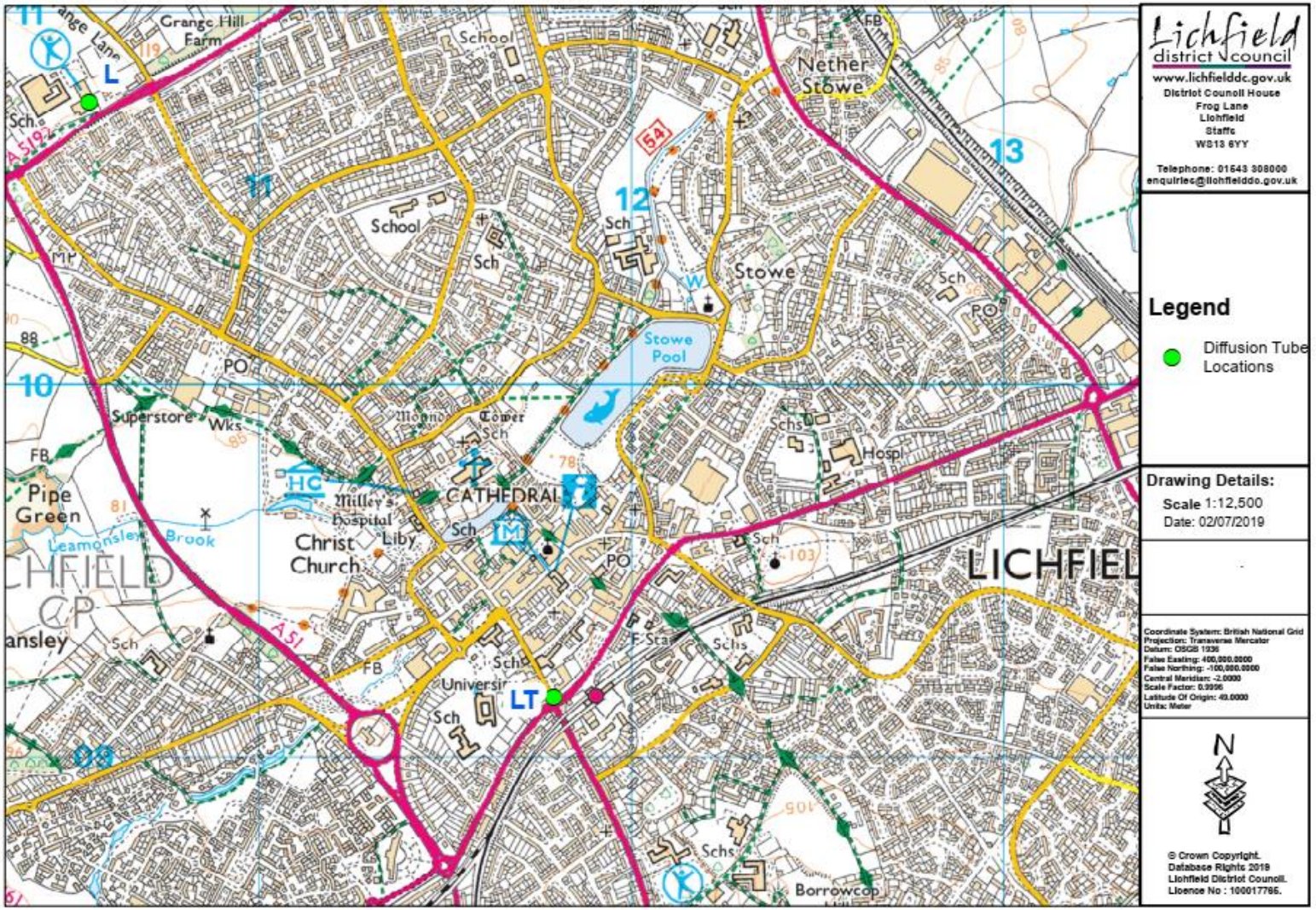
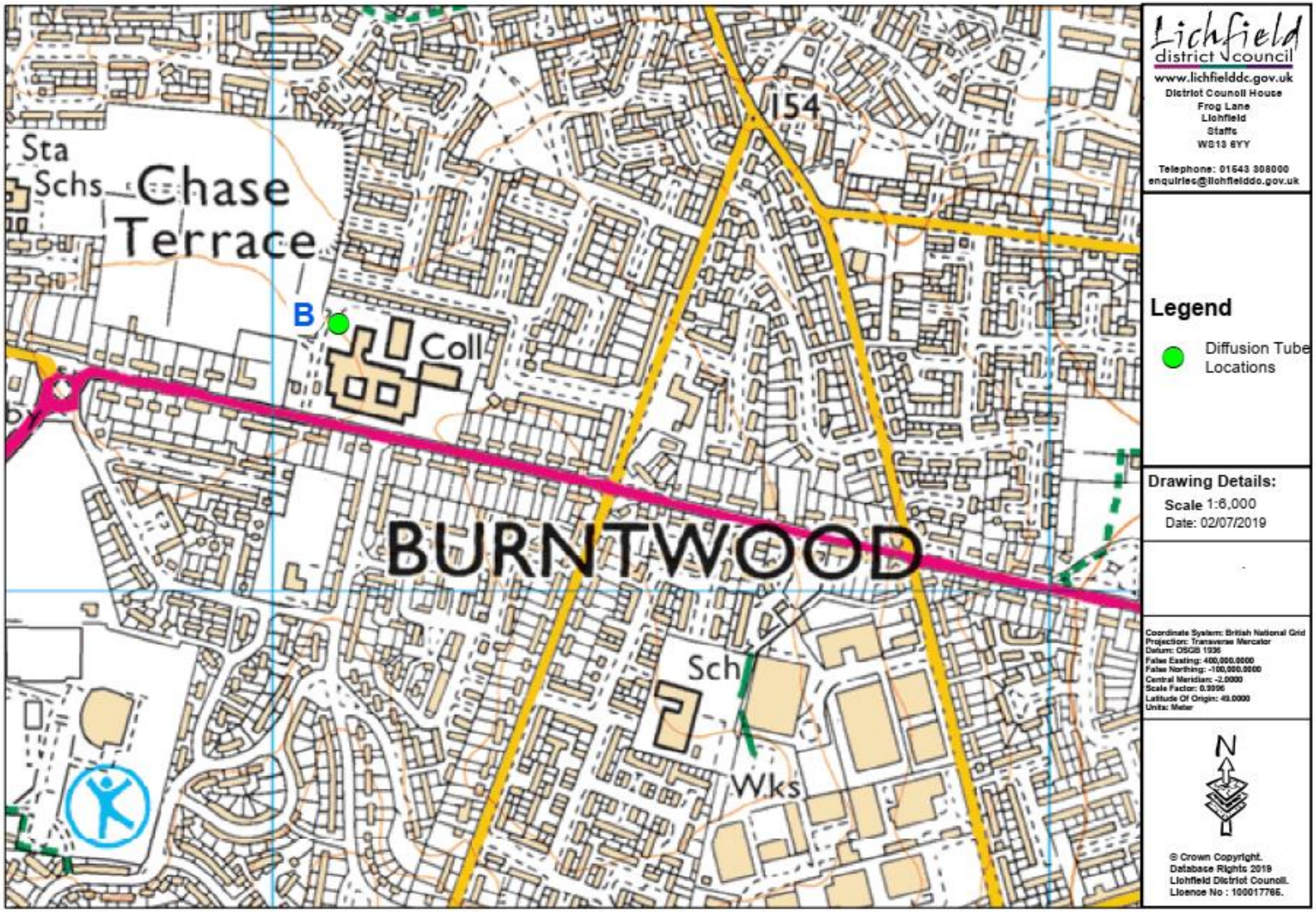


Figure D.6 – Monitoring Locations Outside of AQMAs – Burntwood



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

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	Air quality Annual Status Report
AURN	Automatic, Urban and Rural Network
BPM	Best Practicable Means
CoCP	Code of Construction Practice
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
ES	Environmental Statement
EST	Energy Savings Trust
EU	European Union
EV	Electric Vehicle
HE	Highways England
HGV	Heavy Goods Vehicle
HS_2	High Speed Two – A proposed high speed railway line that will connect London to the Midlands and further north to Scotland
ITS	Integrated Transport Strategy
LA	Local Authority
LAQM	Local Air Quality Management
LDC	Lichfield District Council
LEMP	Local Environmental Management Plan

LEV	Low Emission Vehicle
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NRMM	Non-Road Mobile Machinery
OLEV	Office for Low Emission Vehicles
PHOF	Public Health Outcomes Framework
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
RCP	Royal College of Physicians
SAQF	Staffordshire Air Quality Forum
SO_2	Sulphur Dioxide
SPD	Supplementary Planning Document
STOR	Short Term Operating Reserve – Short Term Electricity Generators to act as back up supplies to the National Grid at times of peak demand
DFT	Department for Transport
UKAS	UK Accreditation Service
ULEV	Ultra-Low Emission Vehicles
UTMC	Urban Traffic Management and Control
VOC	Volatile Organic Compounds
WASP	Workplace Analysis Scheme for Proficiency – a QA/QC protocol for diffusion tubes