North West Leicestershire:
Audit of Local Air Quality Management

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Experts in air quality management & assessment

Document Control

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Executive Summary

This report sets out a review of Local Air Quality Management (LAQM) in North West Leicestershire. It has been carried out by Air Quality Consultants Ltd on behalf of North West Leicestershire District Council.

A review of monitoring sites, Air Quality Management Areas (AQMAs) and emissions sources in the district has been carried out to determine whether there are any additional locations where there is a risk of the objective being exceeded. Following this, recommendations are made about future monitoring which may be necessary to determine any further revocations of AQMAs, and identify any potential further exceedances. Wider recommendations around the focus of air quality work are also included.

Air quality across most of the district is good. Monitoring has demonstrated that even within AQMAs annual mean nitrogen dioxide concentrations are often well below the annual mean air quality objective. As a result, it is recommended that the Kegworth, Coalville and M1 AQMAs are revoked and that monitoring sites within the Copt Oak AQMA are moved to the facade of the nearest property if feasible (with a view to revoking this AQMA). The AQAP should therefore focus on the Castle Donnington AQMA, with some more general measures to prevent deterioration of air quality elsewhere in the district. The measures within the AQAP should be proportionate to the level of exceedance, with a view to concentrations reducing further due to the recent completion of the Castle Donnington Relief Road, and improvements to the vehicle fleet.

A review of the district has been carried out to ascertain whether there are any sources of emissions to air that require further investigation. There are a small number of properties very close to roads that warrant further investigation. No sources other than road traffic which have been identified.

The monitoring strategy in the district has also been reviewed. The locations of most the diffusion tubes are appropriate and most should be retained. Some further locations in Ashby-de-la-Zouch Coalville and Ibstock have been identified which should be reviewed in terms of traffic flows and relevant exposure. It is considered that the number of monitoring locations in Kegworth could be reduced.

Areas for further collaborative work have also been highlighted. These include collaboration with planners and public health, both of which could be engaged with in the AQAP process. These additional areas of work, which focus more on public health and the prevention of deterioration of air quality, and less on the achievement of air quality objectives, are likely to require additional resource.

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1 Introduction

1.1 This report sets out a review of Local Air Quality Management (LAQM) in North West Leicestershire. It has been carried out by Air Quality Consultants Ltd on behalf of North West Leicestershire District Council.

1.2 This review has been carried out to inform future LAQM activities in North West Leicestershire, the requirements for which are set out in Part IV of the Environment Act (1995) (HMSO, 1995) and the relevant Policy and Technical Guidance documents.

1.3 A review of monitoring sites, Air Quality Management Areas (AQMAs) and emissions sources in the district has been carried out to determine whether there are any additional locations where there is a risk of the objective being exceeded. Following this, recommendations are made about future monitoring which may be necessary to determine any further revocations of AQMAs, and identify any potential further exceedances. Wider recommendations around the focus of air quality work are also included.

2 Background

2.1 The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

2.2 The first LAQM report completed by North West Leicestershire District Council was published in 1998. Since then regular reports have been published, as required by the relevant policy guidance at the time. Current guidance (Defra, 2018b) requires Annual Status Reports (ASRs) to be submitted to Defra every year. The ASR should include information about action to improve air quality, monitoring data and any new sources of emissions. If a risk of an objective is identified at a relevant location, the local authority is required to declare an AQMA; either through a fast-track process, or following gathering of additional evidence. Likewise, if an AQMA could be revoked, this would also be reported in the ASR.

2.3 Since the inception of LAQM a number of AQMAs have been declared and revoked in North West Leicestershire[1] and there are currently 5 AQMAs declared in the district (as described in Table 1). These are all locations where residential properties are (or were) near to roads, with road traffic being the dominant source of emissions. The AQMAs include locations adjacent to the M1, and in smaller towns where congested narrow streets prevent full dispersion of pollutants and residential properties are close to the road. No exceedances of any of the other regulated pollutants have been identified in the district.

[1] The historical context of LAQM can be found in the latest ASR (North West Leicestershire District Council, 2019)

Table 1: North West Leicestershire AQMAs

Number	Name	Objective	Year Declared	Description
AQMA 1	Kegworth	NO_2 annual mean	2004	Busy trunk road fronted by residential properties
AQMA 2	M1	NO_2 annual mean/ NO_2 1-hour mean	2004 (annual)/ 2001 (Hourly)	Isolated property close to the M1. The property was removed when the Kegworth bypass was built, so now no relevant exposure
AQMA 3	Castle Donnington	NO_2 annual mean	2008	An area encompassing the High Street and Bondgate area of Castle Donnington.
AQMA 4	Coalville	NO_2 annual mean/ NO_2 1-hour mean	2008 (annual)/ 2012 (Hourly)	An area encompassing parts of Stephenson Way, Broom Leys Road and Bardon Road in Coalville.
AQMA 5	Copt Oak	NO_2 annual mean	2009	An area of the village of Copt Oak that lies within the boundaries of NW Leicestershire District Council.

3 Existing Air Quality

3.1 North West Leicestershire District Council carries out monitoring of nitrogen dioxide concentrations using a network of diffusion tubes, and previously at one automatic analyser. All of the monitoring sites are shown in Figure 1. The Council has declared five Air Quality Management Areas (AQMAs) for exceedances of the annual mean and 1-hour mean nitrogen dioxide objectives (see Figure 2).

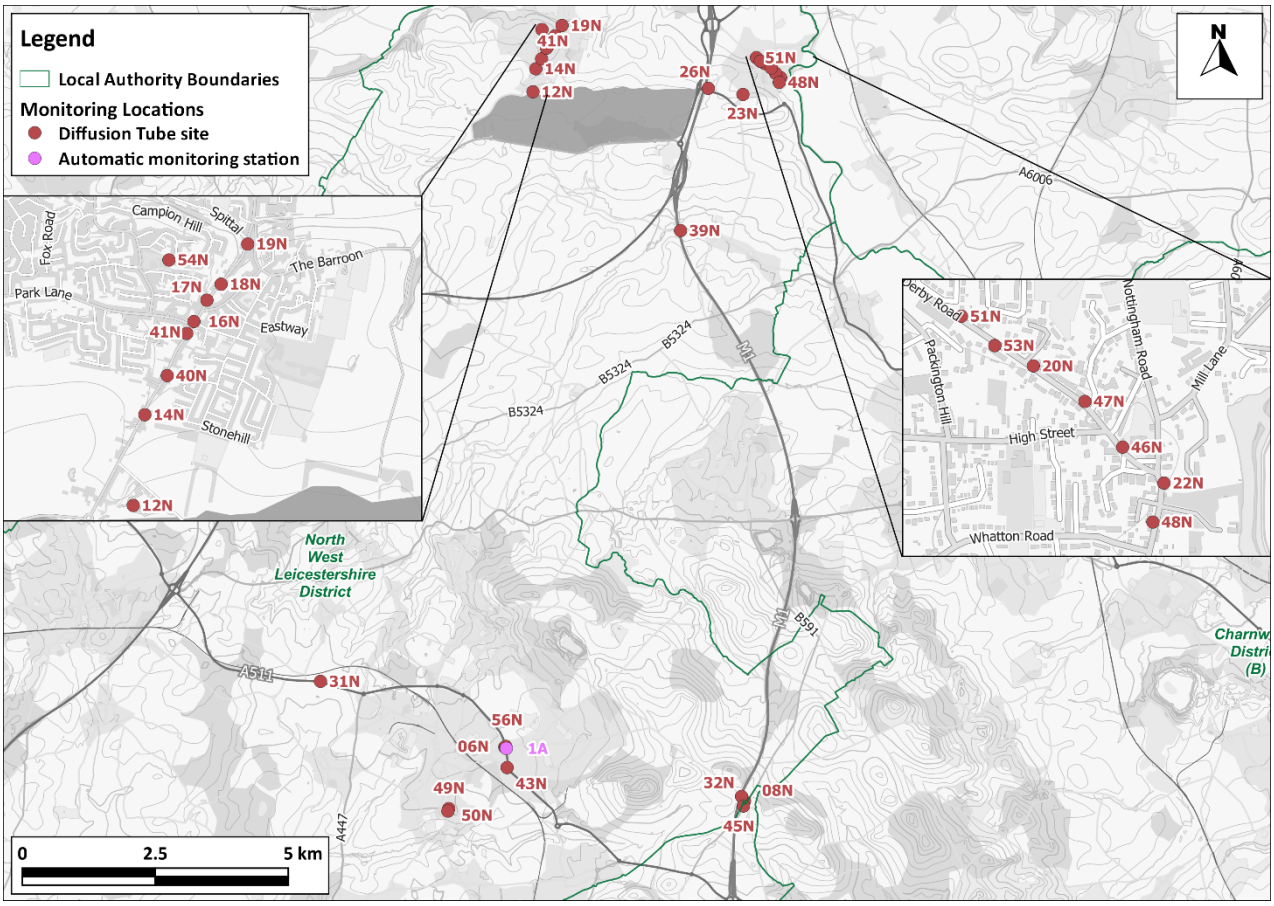

Figure 1: NW Leicestershire Monitoring Locations

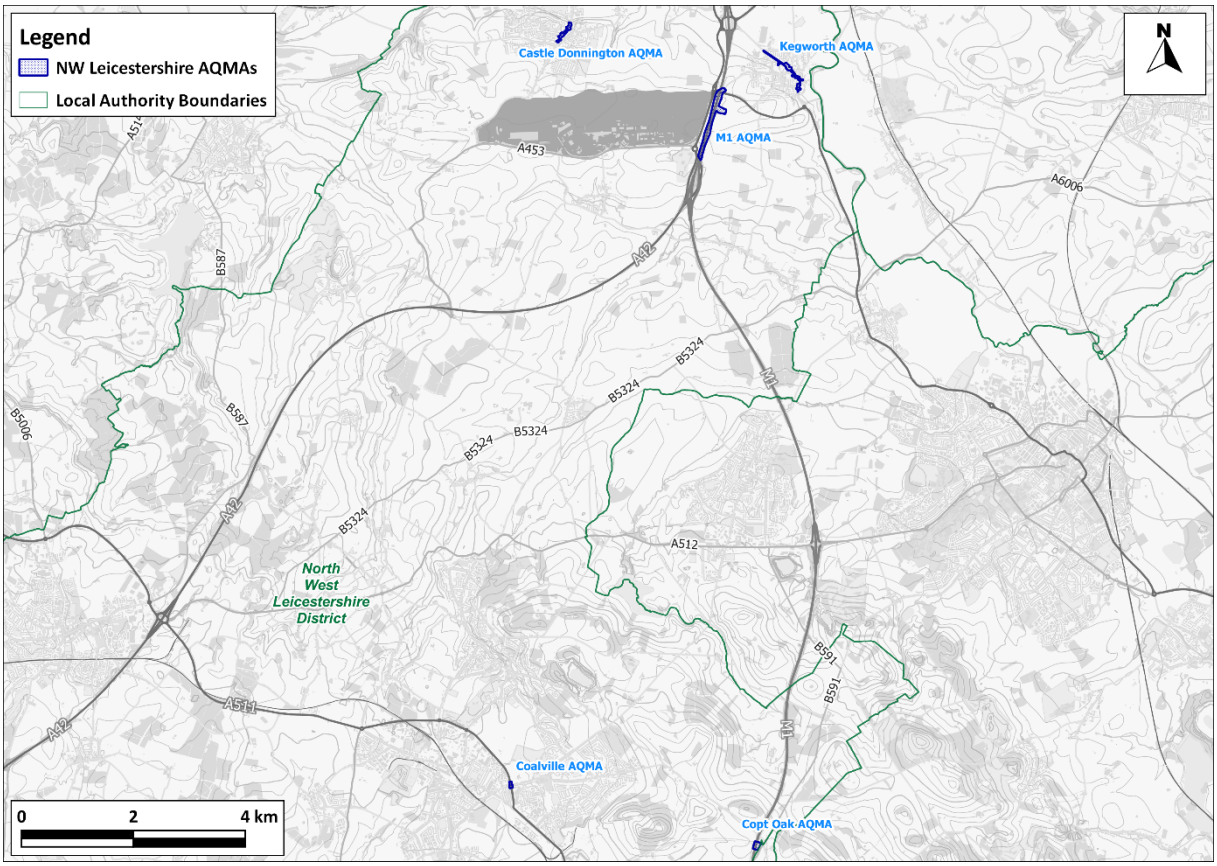

Figure 2: NW Leicestershire Air Quality Managements Areas (AQMAs)

3.2 The following section presents monitoring data for each of the AQMAs and provides recommendations for North West Leicestershire District Council in relation to each of the AQMAs, for progressing with the LAQM process.

Kegworth (AQMA 1)

3.3 Monitoring is carried out using diffusion tubes at seven locations within the AQMA (20N, 22N, 46N, 47N, 48N, 51N and 53N), as seen in Figure 3. As shown in Figure 4 and Table 2, concentrations at 46N and 48N exceeded the objective in 2013 and 2014, but have been consistently below the objective since 2014, as have concentrations at the remaining diffusion tube sites. The was also a reduction in concentrations at all sites between 2018 and 2019, which coincides with the opening of the Kegworth bypass at the end of 2018. It is recommended that, as these diffusion tube sites represent worst case locations and most are closer to the road than relevant receptors, this AQMA is revoked.

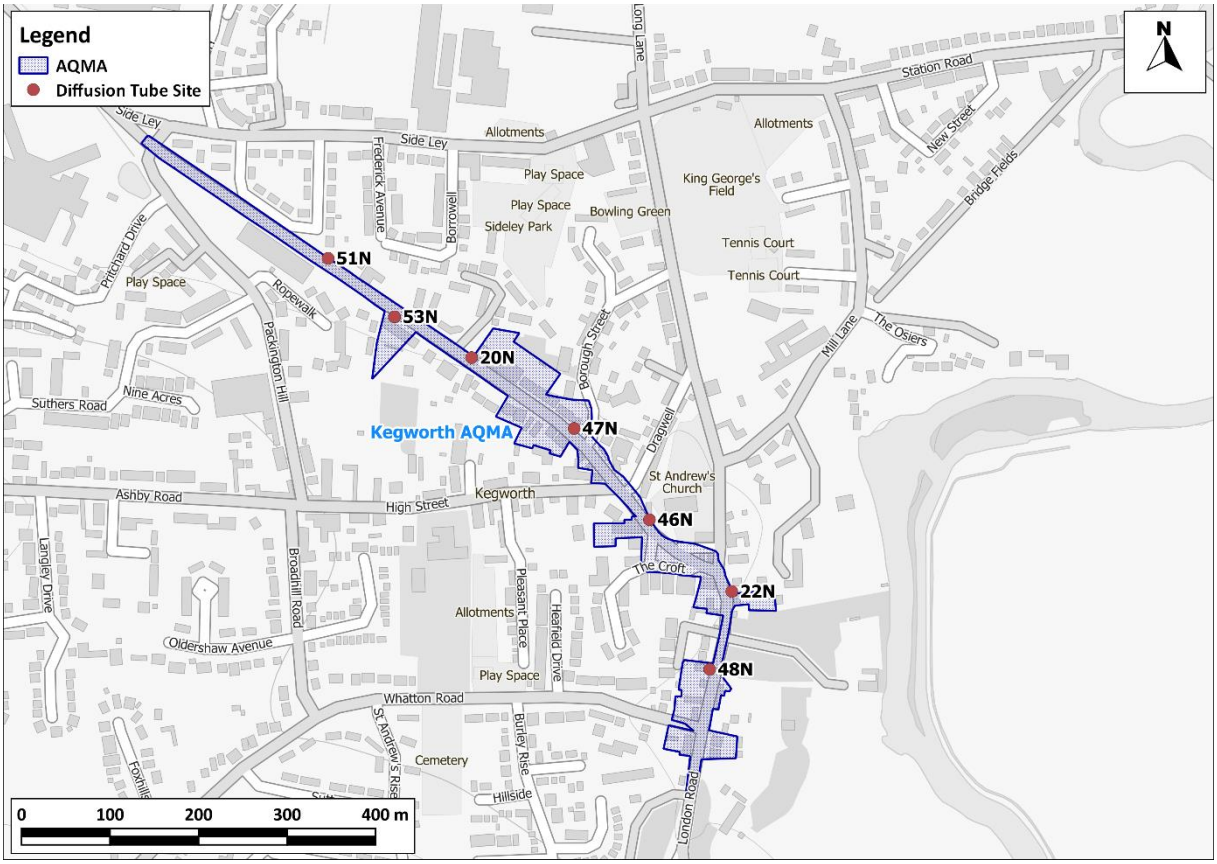

Figure 3: Kegworth AQMA and Nearby Monitoring Sites

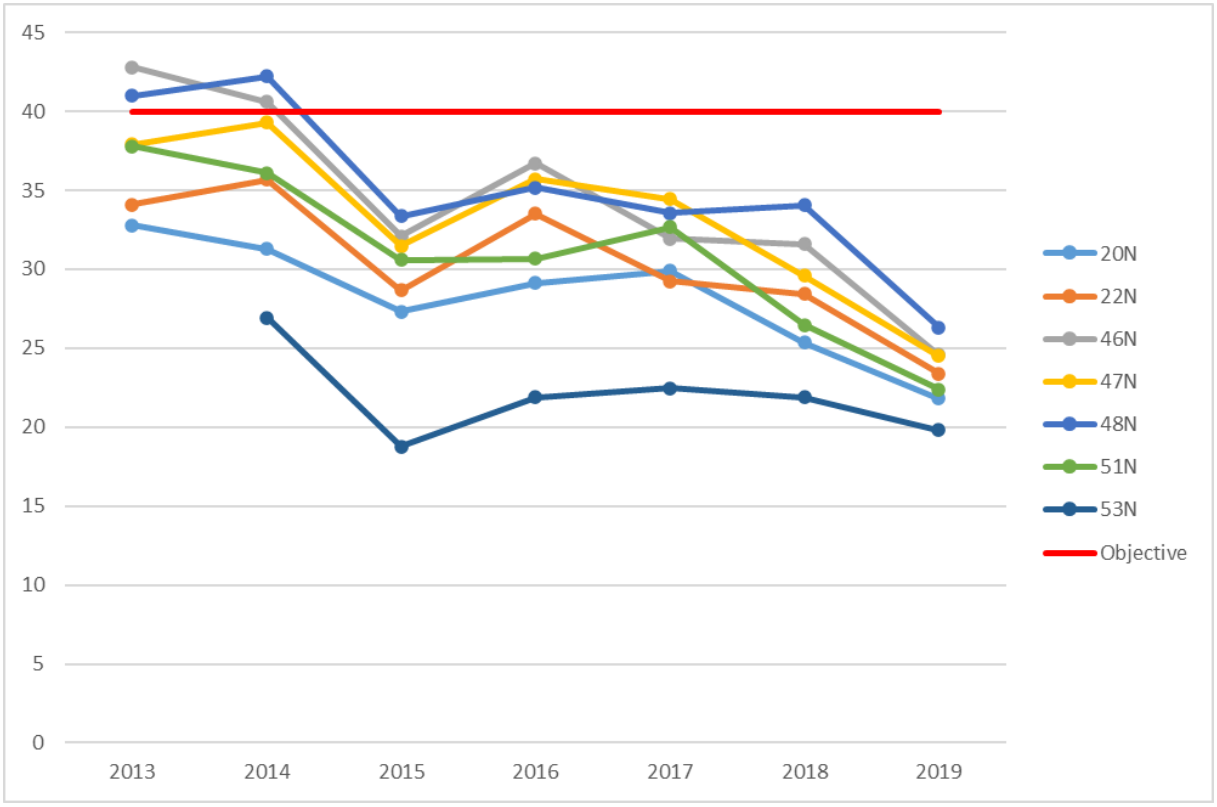

Figure 4: Annual Mean Nitrogen Dioxide Concentrations in Kegworth AQMA (µg/m^3)

Table 2: Summary of Nitrogen Dioxide (NO_2) Monitoring (2013-2019) in Kegworth (µg/m^3)

Site No.	Site Type	Location	2013	2014	2015	2016	2017	2018	2019
20N	Roadside	Derby Road Kegworth	32.8	31.3	27.3	29.1	29.9	25.4	21.8
22N	Roadside	Kegworth A6 2	34.1	35.7	28.7	33.5	29.2	28.4	23.4
46N	Roadside	PO Derby Road Kegworth	**42.8**	**40.6**	32.1	36.7	32.0	31.6	24.6
47N	Roadside	12 Derby Road Kegworth	37.9	39.3	31.5	35.7	34.4	29.6	24.5
48N	Roadside	28 London Road Kegworth	**41.0**	**42.2**	33.4	35.2	33.6	34.1	26.3
51N	Roadside	40mph sign N of petrol station	37.8	36.1	30.6	30.7	32.7	26.5	22.4
53N	Roadside	20 mph sign outside 10 Greenhill Road	-	26.9	18.8	21.9	22.5	21.9	19.8
Objective			**40**						

NB Exceedances of the objectives are shown in bold.

M1 (AQMA 2)

3.4 This AQMA was declared for Mole Hill Farm, which has since been demolished in order to build the Kegworth Bypass. Monitoring is still carried out at one location within the AQMA (26N), as seen in Figure 5, with monitoring previously undertaken at the property itself. This AQMA is to be revoked as there are no longer any sensitive receptors located within this area. In addition, measured annual mean concentrations have been well below the objective since 2013 (see Figure 6 and Table 3).

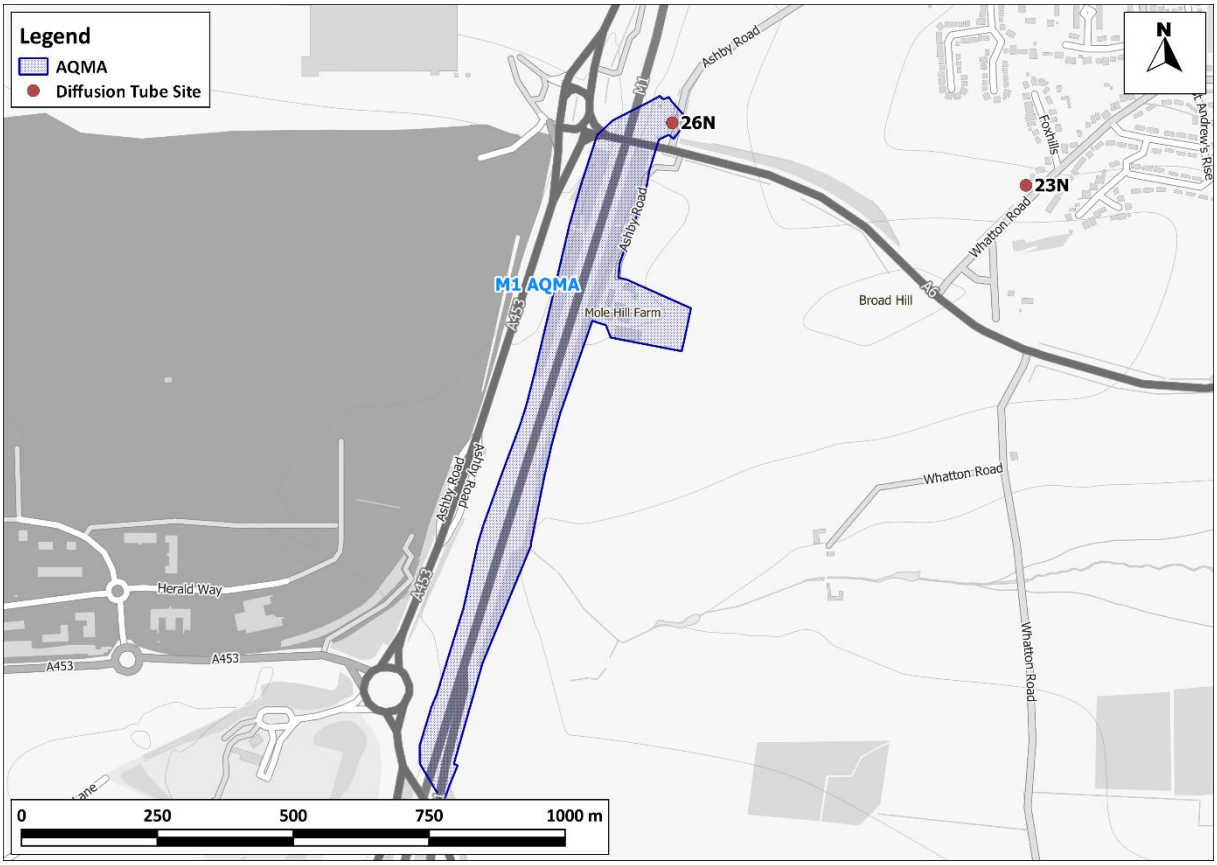

Figure 5: M1 AQMA and Nearby Monitoring Sites

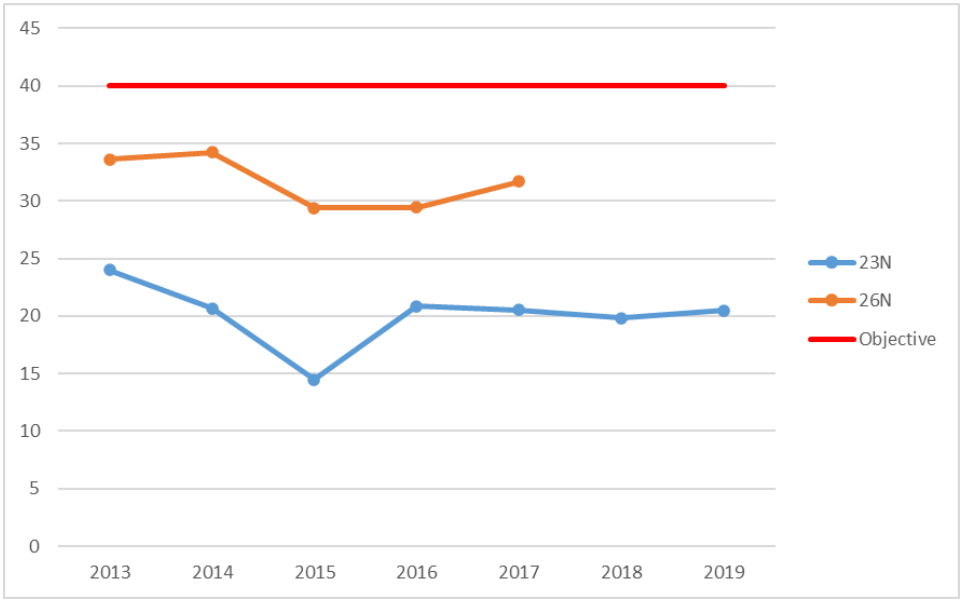

Figure 6: Annual Mean Nitrogen Dioxide Concentrations in M1 AQMA (µg/m^3)

Table 3: Summary of Nitrogen Dioxide (NO_2) Monitoring (2013-2019) near the M1 (µg/m^3)

Site No.	Site Type	Location	2013	2014	2015	2016	2017	2018	2019
23N	Roadside	120 Whatton Road Kegworth	24.0	20.7	14.5	20.8	20.5	19.8	20.5
26N	Roadside	Molehill House	33.6	34.2	29.4	29.5	31.7	-	-
Objective			**40**						

Castle Donnington (AQMA 3)

3.5 Monitoring is carried out in Castle Donnington, using six diffusion tubes; 16N, 17N, 18N, 19N, 41N and 54N. Three of them (17N, 18N and 19N) are located within the AQMA (see Figure 7). As shown in Figure 8 and Table 4, concentrations at the 17N and 19N sites have remained below the objective since 2013, whereas 18N has exceeded the objective for all years presented. As site 18N is located on the façade of a property, and therefore represents relevant exposure, the AQMA should be retained. It is likely that the area of exceedance in Castle Donnington is confined to a short section of the road. 18N is located on the façade of a property which fronts onto a narrow pavement, and a wall and dense foliage on the opposite side of the road forms a short street canyon, which prevents full dispersion of pollutants. There also appears to a be slight gradient on this section of the road, which will increase acceleration of vehicles on this section, further increasing emissions locally. It is likely to be a combination of these factors which are contributing to the exceedance. The trend in nitrogen dioxide concentrations appears to be decreasing, which reflects national analysis over this

time period (Air Quality Consultants Ltd, 2020). It is noted that diffusion tube 41N has been close to or exceeding the annual mean nitrogen dioxide objective over the last 7 years, but the tube is 4m closer to the road than the relevant façade.

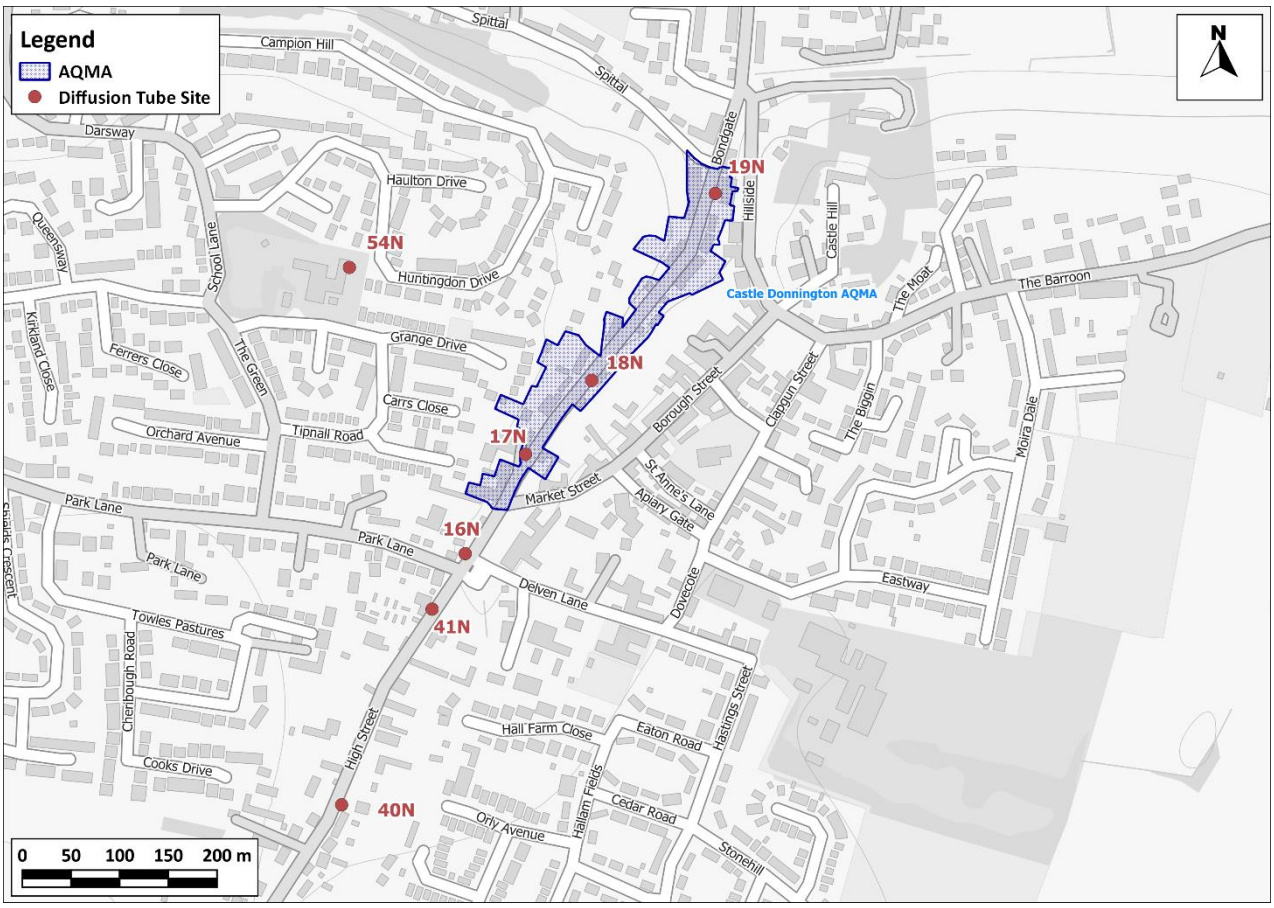

Figure 7: Castle Donnington AQMA and Nearby Monitoring Sites

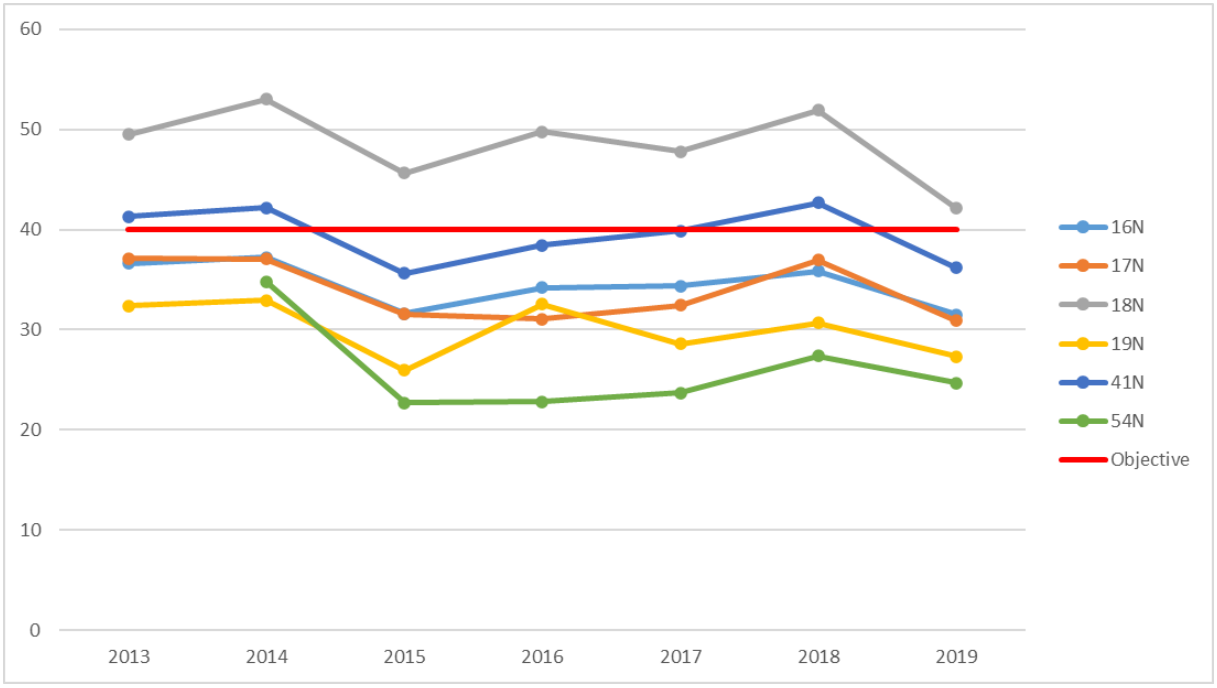

Figure 8: Annual Mean Nitrogen Dioxide Concentrations at Castle Donnington AQMA (µg/m^3)

Table 4: Summary of Nitrogen Dioxide (NO_2) Monitoring (2013-2019), Castle Donnington (µg/m^3)

Site No.	Site Type	Location	2013	2014	2015	2016	2017	2018	2019
16N	Roadside	Bondgate Crossroads Castle Donnington	36.6	37.2	31.6	34.2	34.4	35.9	31.5
17N	Roadside	13 Bondgate Castle Donnington	37.1	37.1	31.6	31.1	32.4	37.0	30.9
18N	Roadside	34 Bondgate Castle Donnington	**49.5**	**53.0**	**45.7**	**49.8**	**47.8**	**51.9**	**42.1**
19N	Roadside	94 Bondgate Castle Donnington	32.4	32.9	25.9	32.6	28.6	30.7	27.3
41N	Roadside	18 High Street Castle Donnington	**41.3**	35.6	38.4	39.9	**42.7**	-	36.2
54N	Roadside	Parking restrictions sign adjacent to drive 12 & 20 Park Lane Castle Donnington	-	34.8	22.7	22.8	23.7	27.4	24.7
Objective			**40**						

NB Exceedances of the objectives are shown in bold.

Coalville (AQMA 4)

3.6 Monitoring has been carried out in the Coalville AQMA at one automatic monitoring site (A1, where monitoring ceased in September 2018) and two diffusion tube sites (06N and 56N). These monitoring sites are located near to residential properties alongside Stephenson Way (A511), as shown in Figure 9. Figure 10 and Table 5, show that concentrations at the two diffusion tube sites have been below the objective since 2013. In contrast, concentrations measured at the automatic monitoring station exceeded the annual mean objective between 2013 and 2017, before falling below the objective in 2018. Concentrations at the automatic monitoring station have never exceeded the 1-hour objective.

3.7 Site A1 was removed in September 2018 and hence 2 years of data showing compliance with the annual mean objective are not available for that location. The monitoring site was, however, located closer to the road than any of the properties representing relevant exposure. Measured concentrations at the diffusion tube monitoring sites are more representative of concentrations at relevant exposure. As these measured concentrations at these sites are below the objective, it is likely that at facades of properties where the air quality objective applies, there are not any exceedances (particularly as the diffusion tubes are also located closer to the road than facades). It is therefore recommended that this AQMA is revoked.

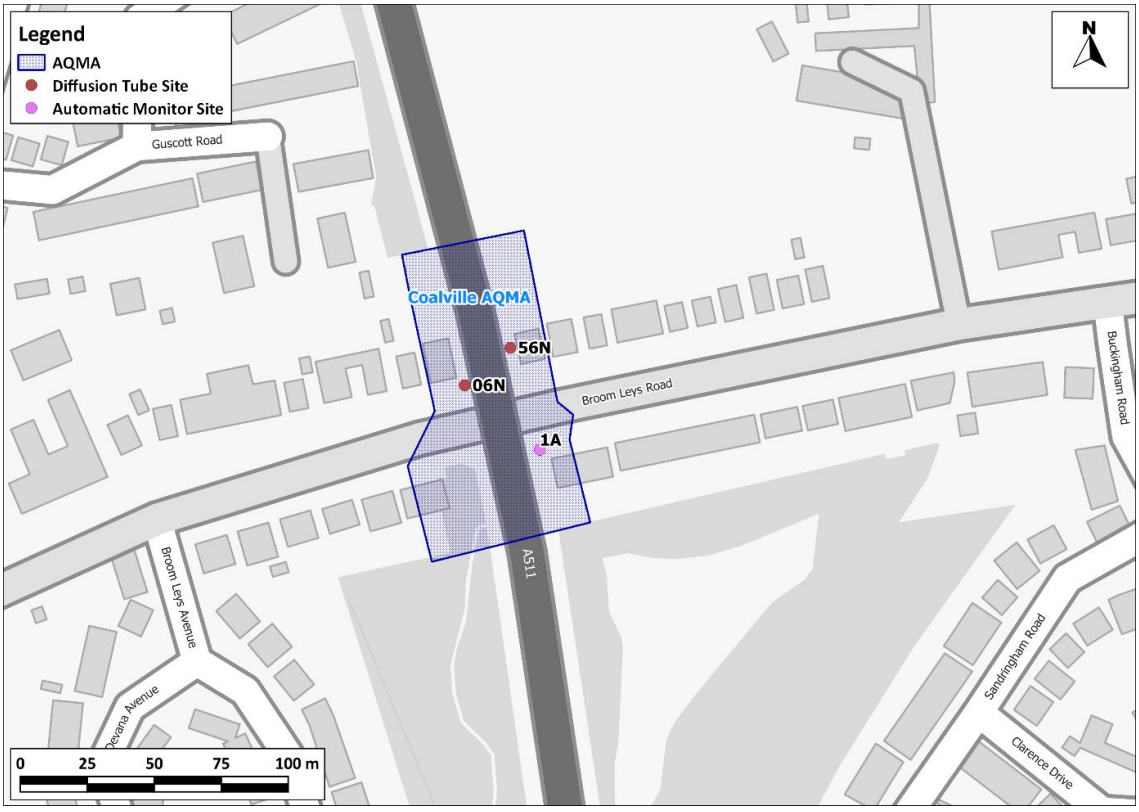

Figure 9: Coalville AQMA and Nearby Monitoring Sites

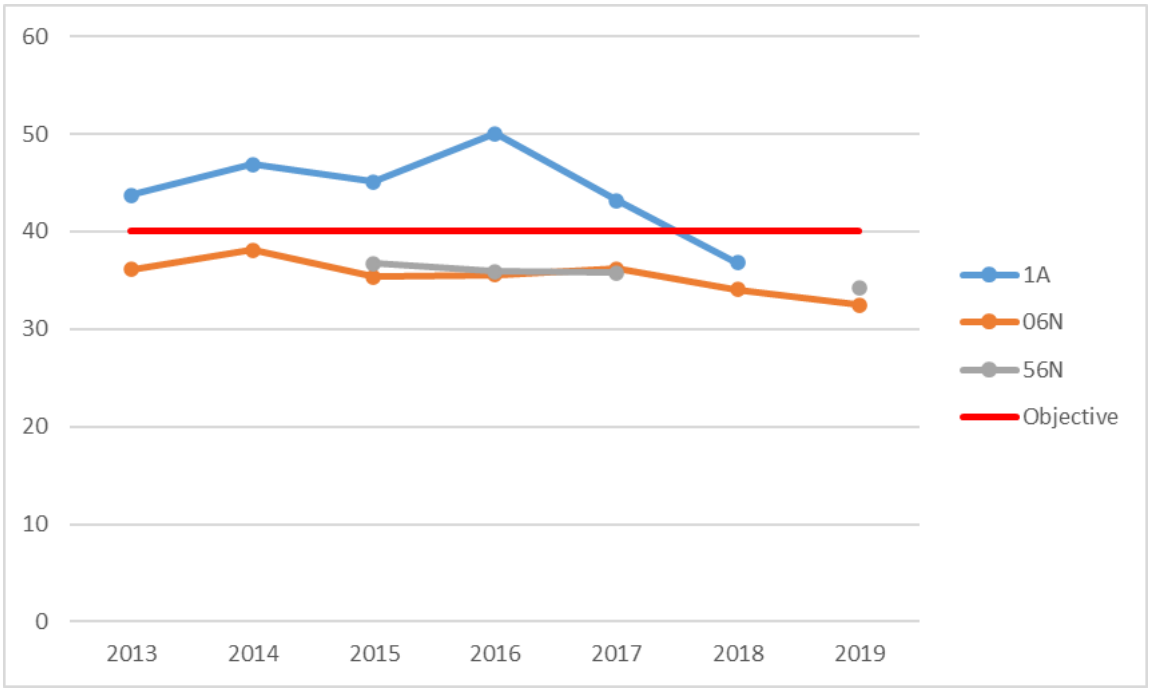

Figure 10: Annual Mean Nitrogen Dioxide Concentrations in Coalville AQMA (µg/m^3)

Table 5: Summary of Nitrogen Dioxide (NO_2) Monitoring (2013-2019), Coalville (µg/m^3)

Site No.	Site Type	Location	2013	2014	2015	2016	2017	2018	2019
Automatic Monitors - Annual Mean (µg/m^3) [a]									
1A	Roadside	Coalville	**43.7**	**46.9**	**45.1**	**50.0**	**43.2**	36.8	-
Objective			**40**						
Automatic Monitors - No. of Hours > 200 µg/m^3									
1A	Roadside	Coalville	2	7	0	4	0	0 (128.7)	-
Objective			**18 (200) [b]**						
Diffusion Tubes - Annual Mean (µg/m^3) [d]									
06N	Roadside	Broomleys junction	36.1	38.1	35.3	35.5	36.2	34.1	32.5
56N	Roadside	Lamppost adjacent 27 Broomleys road	-	-	36.8	35.9	35.7	-	34.2
Objective			**40**						

[a] Exceedances of the objectives are shown in bold.

[b] Values in brackets are 99.79th percentiles, which are presented where data capture is <75%.

Copt Oak (AQMA 5)

Monitoring is carried out using diffusion tubes at three locations near to the Copt Oak AQMA (08N, 32N and 45N), as seen in Figure 11. As shown in Figure 12 and

3.8 Table 6, concentrations at 08N and 45N have been below the objective since 2013, whereas concentrations at 32N have exceeded the objective for all years presented. 32N is located closer to the M1 than either of the properties within the AQMA. Monitoring at this location, although useful for verifying a model, does not indicate whether concentrations at the properties are below or above the annual mean nitrogen dioxide objective. It is therefore recommended that a diffusion tube monitoring site is deployed at the property within the AQMA (this could be instead of 45N or 08N); if this is not feasible, dispersion modelling could be undertaken to ascertain the concentrations at the property, and ultimately whether the AQMA can be revoked.

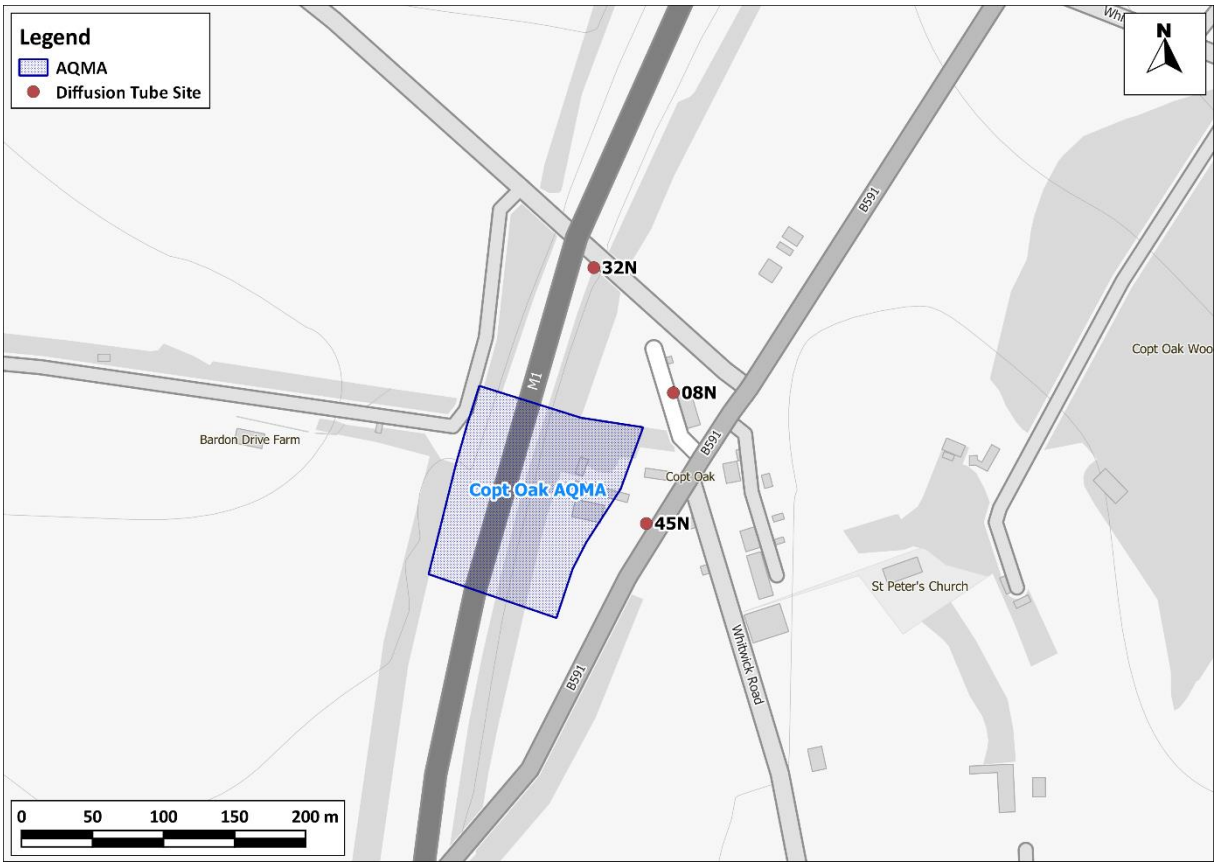

Figure 11: Copt Oak AQMA and Nearby Monitoring Sites

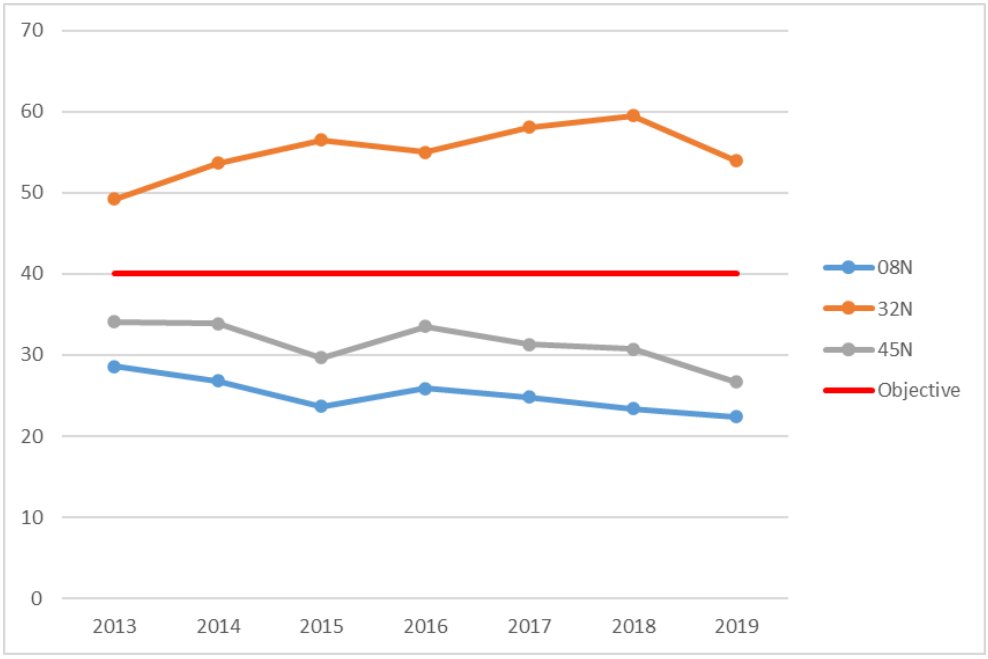

Figure 12: Annual Mean Nitrogen Dioxide Concentrations in Copt Oak AQMA (µg/m^3)

Table 6: Summary of Nitrogen Dioxide (NO_2) Monitoring (2013-2019), Copt Oak (µg/m^3)

Site No.	Site Type	Location	2013	2014	2015	2016	2017	2018	2019
08N	Rural	End Cottage Copt Oak	28.6	26.8	23.7	25.9	24.8	23.4	22.4
32N	Other	M1 Bridge Copt Oak	**49.2**	**53.6**	**56.5**	**55.0**	**58.1**	**59.5**	**53.9**
45N	Roadside	Outside Corner Farm Copt Oak	34.1	33.8	29.7	33.5	31.3	30.7	26.7
Objective			**40**						

NB Exceedances of the objectives are shown in bold.

Other locations and pollutants

3.9 In the future, as nitrogen dioxide concentrations decrease, greater emphasis is likely to be placed on PM_{10} and $PM_{2.5}$ concentrations. This also aligns with Public Health objectives. It would therefore be prudent to give consideration to installing a PM monitor at a suitable location. This could be coordinated at County level through existing working groups, or by setting up a new group if such a group does not currently exist.

3.10 There are existing PM_{10} and $PM_{2.5}$ monitoring sites close to East Midlands Airport, operated by the airport, but data do not seem to been made available on line since 2016. Liaison with the airport around air quality could be increased and this data reported in future ASRs for public information.

3.11 The review of relevant sources has identified some additional locations where it may be appropriate to carry out monitoring of nitrogen dioxide, as discussed in the next section.

4 Review of Sources

4.1 Defra has provided Technical Guidance to local authorities on how to review and assess air quality in their area. The guidance has evolved over the period of 15 years or so, and acknowledges that most of the areas of concern have now been identified. It provides a list of the types of processes or locations where there is a risk that exceedances of the objectives may occur, based on experience throughout the UK. A full review of this list has been carried out to consider whether there are any sources in North West Leicestershire that require further consideration.

4.2 The full list and review is set out in Table 7 to Table 10. Any sources that may require further investigation are highlighted and discussed further in the recommendations section.

Table 7: Road Traffic Sources

Source Category	Pollutant of Concern	Objectives of Concern	Criteria	Any in North West Leicestershire?
Narrow congested streets with residential properties close to the kerb.	NO_2	Long and Short-Term	5,000 vehicles/day- exposure within 2m from kerb - slow moving traffic with frequent stop/start	North West Leicestershire is characterised by small towns and villages which are relatively dispersed and in the main have properties set back from the roads. There do, however, appear to be potential gaps in the monitoring network. Locations initially identified are Ashby-de-la-Zouch, Whitwick, Coalville and Ibstock. NWLDC have recently (15/04/20) started monitoring at some locations in most of these towns. New sites have been established on Nottingham Road and The Callis in Ashby-de-la-Zouch, in North Street and The Green in Whitwick and on Whitwick Road in Coalville.
Busy streets where people may spend 1 hour or more close to traffic	NO_2	Short-Term	10,000 vehicles/day - exposure within 5m from kerb >= 1-hour	No locations identified. From monitoring undertaken within the AQMAs, hourly nitrogen dioxide objective unlikely to be an issue elsewhere.
Roads with a high flow of HDVs	NO_2 / PM_{10}	Long and Short-Term	2,500 HDVs/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	No locations identified.
Junctions	NO_2 / PM_{10}	Long and Short-Term	10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	Junctions have been identified through the LAQM process (for example the AQMA declared at Broom Leys junction in Coalville). There may be other junctions which would benefit from monitoring (assuming they have not been monitored in the past), such as the junction of the A447 and Ashby Road and the junction of Ashby Road and Leicester Road in Ibstock.
New roads constructed or proposed since the last round of Review and Assessment	NO_2 / PM_{10}	Long and Short-Term	if no air quality assessment available from planning application - 10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	Two new roads have recently been built; the Castle Donnington Relief Road and the Kegworth bypass. The Castle Donnington Relief Road completed early in 2020 provides access to areas of new housing, and light industrial estates, from the A453. It also provides a route off the A50 to East Midlands Airport without going through Castle Donnington itself. The road should provide a net benefit to the Castle Donnington AQMA by taking traffic for these locations away from Bondgate. Properties are being built along the new road, but with sufficient distance to ensure that the air quality objectives are not being compromised. The Kegworth bypass was completed in 2018 connecting the A453 with the A6, to connect to the East Midlands Gateway, a new rail freight hub and warehouse complex. This has taken a significant proportion of traffic out of Kegworth, particularly HGVs and therefore is providing a net benefit to the town which is evident in the monitoring data. There is currently no relevant exposure anywhere along the route.

Roads with significantly changed traffic flows	NO_2 / PM_{10}	Long and Short-Term	25% traffic increase on roads > 10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants) - Roads previously identified at risk of exceeding (within 10% of objective)	No locations identified within North West Leicestershire.
Bus and coach stations	NO_2	Long and Short-Term	2,500 bus/coach movements/day [5] - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	None in North West Leicestershire.

Table 8: Non-Road Transport Sources

Source Category	Pollutant of Concern	Objectives of Concern	Criteria	Any in North West Leicestershire?
Airports	NO_2	Long-term	Determine relevant exposure within 1km of the airport boundary; If exposure has been identified, determine whether the airport total equivalent passenger throughput is more than 10 million passengers per annum (mppa). Freight should also be considered, and converted to equivalent mppa using 100,000 tonnes = 1 mppa; and Identify whether the background annual mean NOx concentration is above 25 µg/m^3 in these areas.	East Midlands Airport has less than 10 million passengers although the addition of cargo tonnage does mean that in some years the passenger plus equivalent freight has exceeded the criteria in TG16. The air quality impacts of the airport have been previously assessed and monitoring by the airport is ongoing. https://www.eastmidlandsairport.com/community/local-environmental-impacts/air-quality/ Background annual mean NOx concentration is above 25 µg/m^3 but only in the grid square directly adjacent to the M1. The footprint of the rest of the airport is well below this threshold.
Railway Stationary diesel or steam locomotives:	NO_2, SO_2	Short-term	Identify locations where diesel or steam locomotives are regularly (at least 3 times a day) stationary for periods of 15 minutes or more; and Determine relevant exposure within 15m of the locomotives.	There are no locations where diesel or steam trains are stationary for 15-minutes or more within 15 m of relevant exposure.
Railway - Moving diesel locomotives:	NO_2	Long-term and short-term	Determine relevant exposure within 30m of the relevant railway tracks (Table 7.2 provides information on which lines should be considered); and Identify whether the background annual mean NO2 concentration is above 25µg/m3 in these areas.	None of the railway lines that travel through the district are listed by Defra as have heavy traffic of diesel passenger trains.
Ports	NO_2, PM_{10}, SO_2	Short-term	Is there more than 5,000 large ship movements43 per year, with relevant exposure within 250m of the berths and main areas of manoeuvring; or Is there more than 15,000 large ship movements per year, with relevant exposure within 1km of these areas?	North West Leicestershire is land locked.

Table 9: Industrial Sources

Source Category	Pollutant of Concern	Objectives of Concern	Criteria	Any in North West Leicestershire?
Industrial Installations	All Pollutants	Long and Short-Term	If no air quality assessment available from planning application - New source or existing source with significant increase (30%) in emissions - with population exposure nearby	None relevant in North West Leicestershire
Major Petrol Storage Depots	Benzene	Long-Term	-	There are no major petrol storage depots in the district
Petrol Stations	Benzene	Long-Term	Petrol throughput > 2,000m3 or 2 million litres per year - Near busy road (>30,000 vehicles/day) - Exposure within 10m from the pumps	There are no petrol stations that meet the criteria.
Poultry Farms	PM_{10}	Long and Short-Term	Poultry farms housing in excess of 400,000 birds (if mechanically ventilated) / 200,000 birds (if naturally ventilated) / 100,000 birds (if turkey unit) - Exposure within 100m from the poultry units	There are no poultry Farms exceeding the criteria in the district

Table 10: Domestic and Fugitive or Uncontrolled Sources

Source Category	Pollutant of Concern	Objectives of Concern	Criteria	Any in North West Leicestershire?
Commercial and Domestic Gas-Fired CHP Combustion - Individual Installations	NO_2	Long-Term (NO_2)	Screen using the CHP Screening Tool (see paras 7.43-7.47)	CCHP in Measham given planning permission. No other relevant installations. Modelling undertaken as part of air quality assessment for planning application.
Commercial and Domestic Biomass Combustion - Individual Installations	NO_2 / PM_{10}	Long and Short-Term (NO_2) / Short-Term (PM_{10})	Screen against Target Emission Rate from Biomass Calculator (see paras 7.48-7.53)	
Commercial and Domestic Biomass Combustion - Combined Installations	PM_{10}	Long-Term (Scotland) / Short-Term (not Scotland)	Screen against Threshold Emissions Density from Biomass Calculator (see paras 7.54-7.62)	There are no areas with high densities of biomass combustion in North West Leicestershire.
Domestic Other Solid-Fuel Combustion	SO_2	Long and Short-Term	Density of coal burning premises = 100 per 500m × 500m area	There are no areas with high densities of solid fuel combustion in North West Leicestershire.
Fugitive or uncontrolled Sources	PM_{10}	Long- and short-term	Outside Scotland: exposure within 200m of the source of emission (up to 1km if background PM_{10} > 28µg/m^3)	There are no relevant fugitive or uncontrolled sources in North West Leicestershire.

New Developments

There are two new developments north of Castle Donnington, both for large scale industrial units, storage and distribution warehouses and associated carparking and highways alterations. Both required an Environmental Impact Assessment and air quality assessments undertaken for both of the Environmental Statements concluded that the overall operational air quality effects of the developments are not significant. Although these specific developments do not need to be considered further at this stage, the process of ensuring that the planning system is fully utilised to ensure that air quality does not deteriorate in the future is picked up in Section 5.

5 Recommendations

5.1 There are a number of recommendations as a result of the review, as set out below.

AQMAs

5.2 The following recommendations are made in relation to each of the currently declared AQMAs.

Number	Name	Objective	Recommendation
AQMA 1	Kegworth	NO_2 annual mean	Based on monitored data it is recommended that AQMA 1 is revoked in the next ASR.
AQMA 2	M1	NO_2 annual mean/ NO_2 1-hour mean	AQMA 2 should be revoked in the next ASR as no relevant exposure.
AQMA 3	Castle Donnington	NO_2 annual mean	AQMA 3 should be retained and an Air Quality Action Plan (AQAP) produced to reduce concentrations within Castle Donnington
AQMA 4	Coalville	NO_2 annual mean/ NO_2 1-hour mean	Based on monitored data it is recommended that AQMA 4 is revoked in the next ASR.
AQMA 5	Copt Oak	NO_2 annual mean	If feasible, it is recommended that a diffusion tube is installed on the facade of the property closest to the M1 with a view to revoking this AQMA

5.3 It is only AQMA 3 (Castle Donnington) which currently has a clear exceedance of the annual mean nitrogen dioxide air quality objective. The AQAP should therefore focus on this location with measures specific to Bondgate. However, the Castle Donnington Relief Road, which was completed in early 2020 should help to reduce concentrations along this road, as will improvements to the vehicle fleet, and it is therefore important that any other measures proposed within an AQAP are proportionate to the level of exceedance.

Monitoring

5.4 It has been identified that there may be locations which fit the 'narrow congested street' criteria or 'junction' criteria, as outlined in TG(16), for example in Ashby-de-la-Zouch, Coalville, Whitwick and Ibstock. New monitoring has commenced (April 2020) in Ashby-de-la-Zouch, Whitwick and Coalville, but it is considered that this could be increased particularly in Ashby-de-la-Zouch, Coalville, and Ibstock. Some additional locations have been identified:

- Market Street, Ashby-de-la-Zouch;
- Kilwardby Street, Ashby-de-la-Zouch;
- Belvoir Road, Coalville;
- London Road Coalville (canyon section near to railway crossing);

- Central Road, Coalville; and
- Melbourne Road, Ibstock (terrace houses straight onto pavement).

5.5 It is suggested that at these locations a more thorough review of relevant exposure in close proximity to congested streets and junctions, traffic flows and areas of congestion is undertaken. Particular attention should also be paid to locations with gradients which can also increase emissions locally. Any new locations, where at all possible, should be located directly at locations of relevant exposure.

5.6 Some of the diffusion tubes in Kegworth could be decommissioned as the AQMA is revoked, and moved to the new locations. At least three long term sites should be left in Kegworth to establish long term trends, prioritising tubes representing relevant exposure.

5.7 Monitoring should also be considered in areas which are likely to have large scale development, both to assess any changes in concentrations directly, and provide sites for verification of models used in air quality assessments of these developments.

5.8 NWLDC could consider the installation of a PM monitor at a suitable location in order to establish long term trends in background PM, which is most relevant for health ($PM_{2.5}$ monitoring is the most relevant component for health impacts). Defra guidance (Defra, 2016) notes that "*an increase in $PM_{2.5}$ monitoring is desirable given the links to the Public Health Outcomes Framework*". It is noted that there is currently PM_{10} and $PM_{2.5}$ monitoring close to East Midlands Airport (although no data after 2016 available on their website). NWLDC could liaise more closely with the airport to better utilise the PM data which already exists.

Planning System

5.9 The spatial planning system has an important role to play in improving air quality and reducing exposure to air pollution. Both the development of local planning policies and the determination of individual planning applications are important, the former setting the framework for the latter. NWLDC already ask developers to assess the impacts of developments which may adversely affect air quality in the district. In order for this process to be robust, air quality assessments must be consistently requested and critically appraised, which requires both expertise and sufficient resourcing.

5.10 Another important consideration is the cumulative impacts of a number of smaller developments impacting on the same locations. One example of this could be the two developments north of Castle Donnington, which separately may not have a significant effect, but cumulatively may add enough traffic into an AQMA to increase concentrations. In order to ensure that cumulative issues are addressed, it should be ensured that air quality assessments include any nearby committed developments in their future baseline modelling.

5.11 East Midlands Airport has expanded its freight operations and is likely to expand further in relation to both freight and passengers. Infrastructure improvements have been made (such as the Castle Donnington Relief Road), but any further expansion should be carefully planned in relation to infrastructure for traffic generation. It is recommended that North West Leicestershire Council work more closely with the airport to ensure that air quality is fully considered in any decision making, and that monitoring at the airport is reviewed and incorporated into the LAQM process.

5.12 The action planning process in North West Leicestershire should incorporate measures for planning which will not only help in the achievement of air quality objectives, but also prevent locations currently achieving the objective from deteriorating in the future. Current collaboration with development control should be built upon to proactively manage air quality. The planning system also provides an opportunity for funding action plan measures.

Collaborative work

5.13 As concentrations of nitrogen dioxide reduce, the focus of air quality work in the UK is likely to turn to Particulate Matter (PM) which is less locally controllable, but is a more important metric in relation to health effects. Particulate matter is different from the gaseous pollutants in that it is not a clearly defined chemical compound. It can be expressed in a number of ways, by size, composition, origin or other metrics. PM_{10} and $PM_{2.5}$ are the most commonly used units[2]. In relation to PM, further collaborative work with Public Health is likely, which could be undertaken at local authority level or collaboratively with other local authorities in the County. The work may involve assessing background concentrations of $PM_{2.5}$, or population weighted concentrations[3], and implementing measures to both reduce exposure to PM and reduce overall concentrations of $PM_{2.5}$.

5.14 Another area for collaborative work is ensuring that any updates to the Local Plan have fully considered air quality. This may be through an assessment of the impacts of housing and employment allocations on air quality (which may or may not be quantified), and by ensuring that a robust policy for air quality is included. Any specific guidance for developers could be published separately (where local requirements are beyond what is currently in published guidance), including requirements for air quality assessments, low emission vehicle infrastructure and mitigation.

5.15 Providing information to the public is an area which may also need to be prioritised, both as part of the Action Planning process, and more generally through work with Public Health. Ensuring clear messages for the public is difficult for a technical area such as air quality. The messaging should also link in with climate change aspirations. For example, communication around measures such as active travel will assist in modal shift away from private vehicles. Following the Coronavirus

[2] PM_{10}, or course particles are particles that are less than 10 microns (µm) in diameter. $PM_{2.5}$, or fine particles, are particles that are less than 2.5 µm in diameter

[3] One way of estimating exposure for the population as a whole

lockdown, utilising messages at national level to reiterate local advice may provide a useful opportunity to retain and enhance levels of cycling and walking.

5.16 It may be that a resource efficient way of encouraging collaboration, and increasing knowledge within NWLDC is to undertake a workshop on air quality which could include planners (development control and strategic planners), transport planners at local and County level and elected members. The aim of the workshop could be to both increase knowledge of air quality and discuss potential options for the Action Plan (focusing on Castle Donnington, but measures could be considered more widely). This could be undertaken as part of the action planning process.

5.17 These additional areas of work, which focus more on public health and the prevention of a worsening of air quality, and less on the achievement of air quality objectives, are likely to require additional resource (in terms of staff time, and potentially monitoring of $PM_{2.5}$ which will be more expensive than nitrogen dioxide). Currently NWLDC has half a post which covers air quality, with the officer covering 2 local authorities, while also covering contaminated land. It is considered that the increase in scope is likely to require increasing at least to a whole post. The vast majority of the knowledge of monitoring sites, analysis techniques and the LAQM process also rests with the air quality officer and it is suggested that to ensure resilience in staffing, other members of the team are included in at least some of the areas of work. Assuming the role is increased to cover other collaborative areas, it is suggested that at least two members of staff have experience and knowledge of the air quality area (ie the post could be split between 2 different members of staff).

6 Summary and Conclusions

6.1 Air quality across most of the district is good. Monitoring has demonstrated that even within AQMAs annual mean nitrogen dioxide concentrations are often well below the annual mean air quality objective. As a result, it is recommended that the Kegworth, Coalville and M1 AQMAs are revoked and that monitoring sites within the Copt Oak AQMA are moved to the facade of the nearest property if feasible (with a view to revoking this AQMA). The AQAP should therefore focus on the Castle Donnington AQMA, with some more general measures to prevent deterioration of air quality elsewhere in the district. The measures within the AQAP should be proportionate to the level of exceedance, with a view to concentrations reducing further due to the recent completion of the Castle Donnington Relief Road, and improvements to the vehicle fleet.

6.2 A review of the district has been carried out to ascertain whether there are any sources of emissions to air that require further investigation. There are a small number of properties very close to roads that warrant further investigation. No sources other than road traffic which have been identified.

6.3 The monitoring strategy in the district has also been reviewed. The locations of most of the diffusion tubes are appropriate and most should be retained. Some further locations in Ashby-de-la-Zouch, Coalville and Ibstock have been identified which should be reviewed in terms of traffic flows and relevant exposure. It is considered that the number of monitoring locations in Kegworth could be reduced.

6.4 Areas for further collaborative work have also been highlighted. These include collaboration with planners and public health, both of which could be engaged with in the AQAP process. These additional areas of work, which focus more on public health and the prevention of deterioration of air quality, and less on the achievement of air quality objectives, are likely to require additional resource.

7 References

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8 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
CHP	Combined Heat and Power
CCHP	Combined Chilling Heat and Power
Defra	Department for Environment, Food and Rural Affairs
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Goods Vehicle
kph	Kilometres Per hour
LAQM	Local Air Quality Management
µg/m^3	Microgrammes per cubic metre
NO_2	Nitrogen dioxide
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal

9 Appendices

A1 Professional Experience

Penny Wilson, BSc (Hons) CSci MIEnvSc MIAQM

Ms Wilson is an Associate Director with AQC, with more than 19 years' relevant experience in the field of air quality. She has carried out numerous assessments for a range of infrastructure developments including power stations, road schemes, ports, airports and residential/commercial developments. The assessments have covered operational and construction impacts, including odours. She also provides services to local authorities in support of their LAQM duties, including the preparation of Review and Assessment and Action Plan reports, as well as audits of Air Quality Assessments submitted with planning applications. She has provided expert evidence to a number of Public Inquiries, and is a Member of the Institute of Air Quality Management and a Chartered Scientist.

Dr Clare Beattie, BSc (Hons) MSc PhD CSci MIEnvSc MIAQM

Dr Beattie is an Associate Director with AQC, with more than 20 years' relevant experience. She has been involved in air quality management and assessment, and policy formulation in both an academic and consultancy environment. She has prepared air quality review and assessment reports, strategies and action plans for local authorities and has developed guidance documents on air quality management on behalf of central government, local government and NGOs. She has led on the air quality inputs into Clean Air Zone feasibility studies and has provided support to local authorities on the integration of air quality considerations into Local Transport Plans and planning policy processes. Dr Beattie has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has carried out numerous assessments for new residential and commercial developments, including the negotiation of mitigation measures where relevant. She has also acted as an expert witness for both residential and commercial developments. She has carried out BREEAM assessments covering air quality for new developments. Dr Beattie has also managed contracts on behalf of Defra in relation to allocating funding for the implementation of air quality improvement measures. She is a Member of the Institute of Air Quality Management, Institute of Environmental Sciences and is a Chartered Scientist.

George Chousos, BSc MSc AMIEnvSc AMIAQM

Mr Chousos is an Assistant Consultant with AQC, having joined in May 2019. Prior to joining AQC, he completed an MSc in Air Pollution Management and Control at the University of Birmingham, specialising in air pollution control technologies and management, and data processing using R. He also holds a degree in Environmental Geoscience from the University of Cardiff, where he undertook a year in industry working in the field of photo-catalytic technology. He is now gaining experience in the field of air quality monitoring and assessment.

Further Information is available at www.aqconsultants.co.uk.