



Baseline Air Quality Assessment:

Land East of Boothstown,
Greater Manchester
Spatial Framework

March 2019



Experts in air quality
management & assessment



Document Control

Client	Peel Holdings (Land & Property) Ltd.	Principal Contact	Becki Hinchcliffe
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Report Prepared By:	Caroline Odbert
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Air Quality Consultants Ltd
23 Coldharbour Road, Bristol BS6 7JT Tel: 0117 974 1086
119 Marylebone Road, London NW1 5PU Tel: 020 3873 4780
aqc@aqconsultants.co.uk

Registered Office: 23 Coldharbour Road, Bristol BS6 7JT
 Companies House Registration No: 2814570

1 Introduction

- 1.1 This report provides a desktop baseline air quality study for the proposed housing allocation on land east of Boothstown (the “Allocation Site”), in Salford, as part of the Greater Manchester Spatial Framework (GMSF). The assessment has been carried out by Air Quality Consultants Ltd. on behalf of Peel Holdings (Land & Property) Ltd.
- 1.2 The Allocation Site is currently designated as green belt land and is being promoted for release and allocation for a sustainable urban extension comprising around 300 dwellings. This baseline study has been carried out to identify any potential air quality constraints to the development of the site for residential use. It considers the following:
- existing baseline air quality conditions, including:
 - a site description;
 - identification of nearby major sources of air pollution;
 - a review of Greater Manchester’s Air Quality Review and Assessment Reports for identification of nearby Air Quality Management Areas (AQMAs);
 - identification of nearby relevant air quality monitoring; and
 - identification of background concentrations.
 - identification of the potential air quality constraints associated with the proposed development of the land for residential use;
 - outline of the scope of works likely to be required for a detailed air quality assessment to be carried out for a future planning application for the development of the land; and
 - a summary overview.

2 Baseline Air Quality

Site Description

- 2.1 The Allocation Site (shown in Figure 1) is located to the east of the existing neighbourhood of Boothstown, in Salford. It is located south of the A572 Leigh Road, which is a major arterial road and represents the principal source of air pollution at the Allocation Site. The Bridgwater Canal forms the southern boundary.

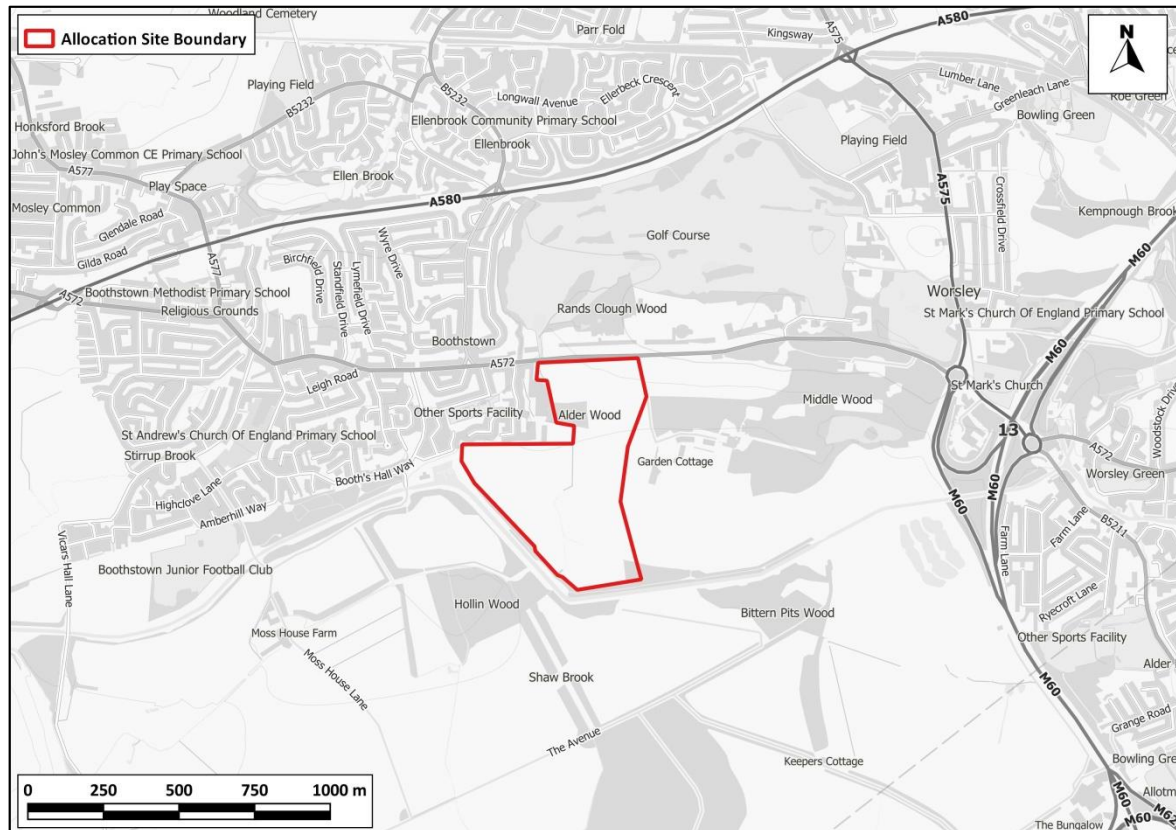


Figure 1: Allocation Site Location Plan

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Industrial sources

- 2.2 A search of the UK Pollutant Release and Transfer Register (Defra, 2019a) did not identify any industrial or waste management sources with the potential to adversely affect the Allocation Site, in terms of air quality.
- 2.3 The Carrington Power Plant is an 880 MW gas-fired, combined cycle peaking power plant located on Manchester Road, approximately 5 km south of the Allocation Site. It commenced operations in 2016 and to date no emissions data for the plant has been published. It will be a significant source of nitrogen dioxide (NO₂) emissions and will contribute to background nitrogen dioxide concentrations in the area. However, given the separation distance, it is unlikely to adversely impact on the Allocation Site.

Air Quality Review and Assessment

- 2.4 The ten local authorities (which includes Salford) that make up Greater Manchester have come together to form a combined authority, known as the Greater Manchester Combined Authority (GMCA). The GMCA investigates air quality within the Greater Manchester area as part of its

responsibilities under the LAQM regime, and in April 2016 declared a single Greater Manchester AQMA (Salford City Council, 2017), bringing together the AQMA previously declared by the ten local authorities. The AQMA is for exceedances of the UK Government's annual mean nitrogen dioxide objective (see Appendix A1). The Greater Manchester AQMA is shown in Figure 2; part of the AQMA is located adjacent, or near to, the Allocation Site, along the M60 Manchester Outer Ring Road, A580 East Lancashire Road and parts of the A572 Worsley Road.

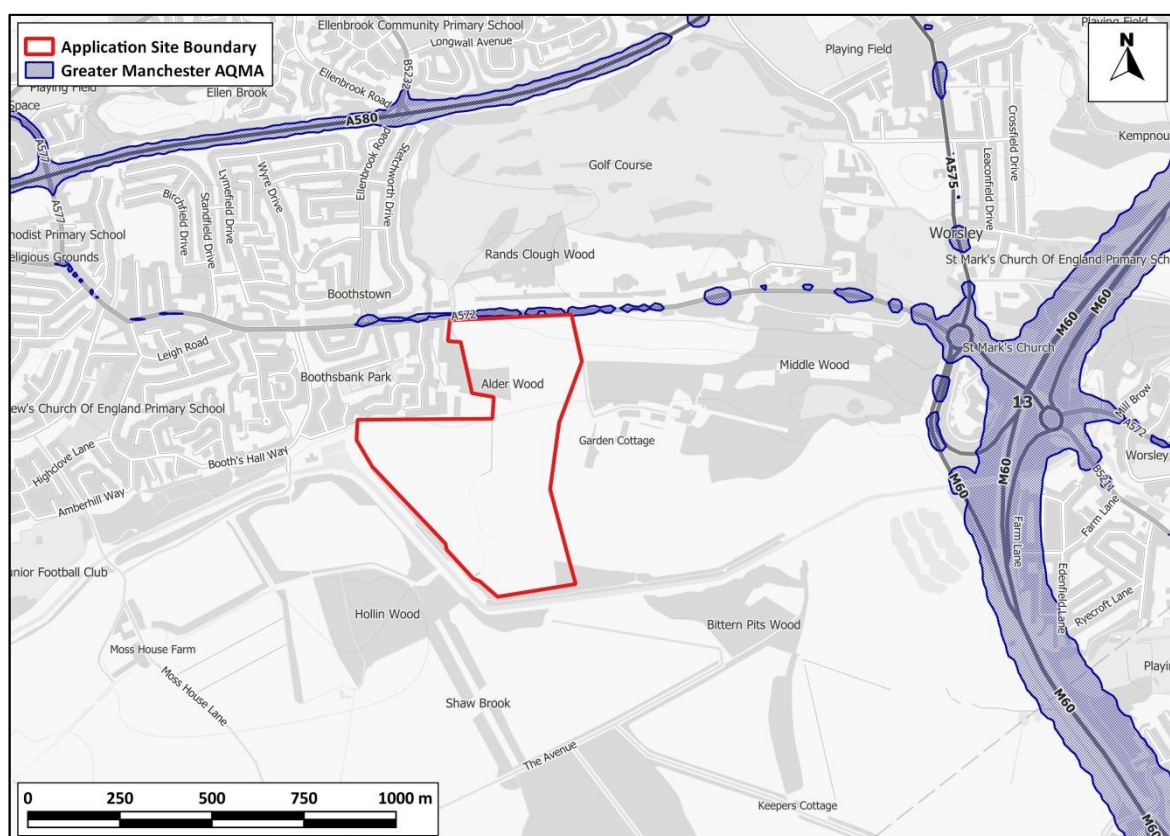


Figure 2: Greater Manchester AQMA

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- 2.5 In terms of PM₁₀, the GMCA concluded that there are no exceedances of the objectives. It is, therefore, reasonable to assume that existing PM₁₀ levels will not exceed the objectives near to the proposed site (Greater Manchester Combined Authority, 2017).
- 2.6 Further information is provided on the national air quality objectives in Appendix A1.

Local Air Quality Monitoring

- 2.7 The GMCA operates seventeen automatic monitoring stations within its area, three of which are located in Salford. One of these is located approximately 1.3 km east of the Allocation Site,

adjacent to the M60. Two others are further away, one being near the M602 in Eccles (Salford Eccles), and the other an urban background site in Glazebury. Salford City Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Staffordshire Scientifics Services (using the 20% TEA in water method). These include two sites in close proximity to the Allocation Site, both adjacent to the A572, one being 200 m west of the Allocation Site, the other being 500 m to the west. There are an additional six monitoring sites within 1.5 km of the Allocation Site. Results from these sites for the years 2012 to 2017 are summarised in Table 1 and the monitoring locations are shown in Figure 3.

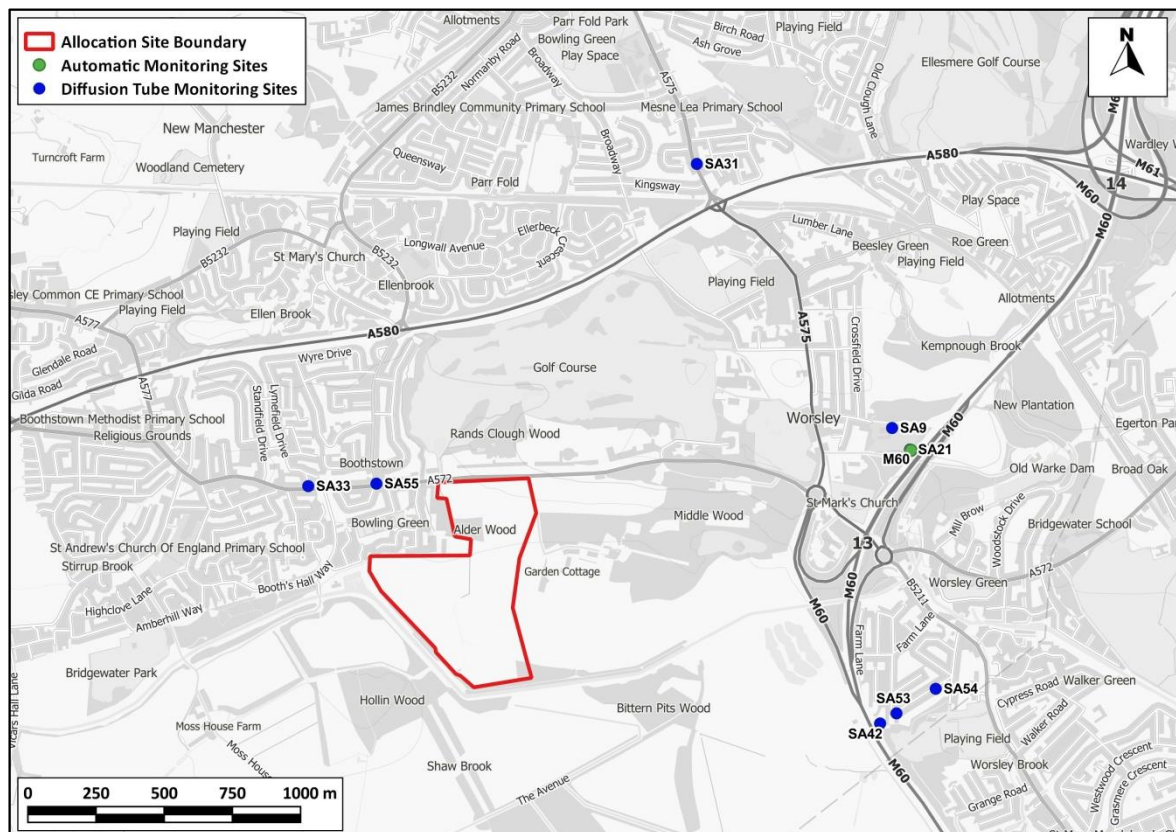


Figure 3: Local Air Quality Monitoring Sites

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- 2.8 Measured concentrations at the M60 automatic and diffusion tube sites exceeded the annual mean nitrogen dioxide objective ($40 \mu\text{g}/\text{m}^3$ – see Appendix A1) for the last six years (2012 to 2017). Concentrations exceeded the objective at the SA42 diffusion tube monitoring sites further down the M60 during the period 2011 to 2014. The nearest, and most representative, diffusion tube monitoring sites to the Allocation Site (SA33 and SA55) have reported concentrations below the objective for the last six years and four years respectively. There appears to have been an overall

downward trend in annual mean concentrations at these monitoring sites for the years 2012 to 2017.

- 2.9 The 1-hour mean objective was not exceeded at any of the automatic monitors between 2012 and 2017. As the measured concentrations at the diffusion tube monitoring sites over the last 6 years are below $60 \mu\text{g}/\text{m}^3$, the 1-hour mean objective is unlikely to have been exceeded.

Table 1: Summary of Nitrogen Dioxide (NO₂) Monitoring (2011-2017) ^{a, b}

Site No.	Site Type	Location	2012	2013	2014	2015	2016	2017
Automatic Monitor - Annual Mean ($\mu\text{g}/\text{m}^3$)								
M60	Urban Traffic	Salford M60	62.2	61.5	59.6	52.1	46.1	43.3
Objective			40					
Automatic Monitor - No. of Hours > $200 \mu\text{g}/\text{m}^3$								
M60	Urban Traffic	Salford M60	8 (191)	4 (187)	0	3	0	0
Objective			18 (200) ^c					
Diffusion Tubes - Annual Mean ($\mu\text{g}/\text{m}^3$)								
SA9	Urban Background	St Marks School	30.2	27.2	28.8	25.1	27.1	25.3
SA20	Roadside	M60 Colocation	52.1	48.7	46.8	43.0	44.0	39.4
SA21	Roadside	M60 Colocation	51.2	50.3	49.5	43.4	46.0	40.2
SA22	Roadside	M60 Colocation	49.5	51.3	47.1	43.7	46.0	41.8
SA31	Roadside	Walkden Road	32.3	30.6	31.5	29.2	32.5	30.4
SA33	Roadside	Arnfield Drive	32.3	31.3	30.7	29.1	31.5	30.4
SA42	Roadside	Edenfield Lane	42.4	44.2	40.4	38.7	39.1	37
SA53	Urban Background	Ryecroft Lane	-	49.0	36.1	36.3	36.5	34.2
SA54	Urban Background	Ryecroft Lane	-	31.4	30.6	28.3	30.9	29.5
SA55	Roadside	Leigh Rd/Ellenbrook Rd	-	-	35.9	33.6	37.9	34.8
Objective			40					

^a Exceedances of the objectives are shown in bold.

^b 2012 to 2017 automatic data have been downloaded from the Air Quality England website (Air Quality England, 2019) and 2012 - 2017 diffusion tube data were provided by Salford City Council.

^c Values in brackets are 99.79th percentiles, which are presented where data capture is less than 90%.

- 2.10 The M60 automatic monitoring station also measures PM₁₀ concentrations, with results for the years 2012 to 2017 summarised in Table 2. The council began measuring PM_{2.5} concentrations at the M60 automatic monitoring station in 2017; the results for this year are also presented in Table 2. There were no measured exceedances of either of the objectives.

Table 2: Summary of PM₁₀ Automatic Monitoring (2011-2017) ^a

Site No.	Site Type	Location	2012	2013	2014	2015	2016	2017
PM₁₀ Annual Mean (µg/m³)								
-	Roadside	Salford M60	23.3	24.7	20.7	19.5	21.4	20.2
Objective			40					
PM₁₀ No. Days >50 µg/m³								
-	Roadside	Salford M60	16	19	3 (34)	5	5 (34)	8 (31)
Objective			35 (50) ^b					
PM_{2.5} Annual Mean (µg/m³)								
	Roadside	Salford M60	-	-	-	-	-	9.1
Objective			25 ^c					

^a Reference equivalent. 2012-2017 automatic data have been downloaded from the Air Quality England website (Air Quality England, 2019).

^b Data capture was less than 90% in 2014, 2016 and 2017 and thus the 90.4th percentile of daily means is provided in parentheses.

^c The PM_{2.5} objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Exceedances of EU Limit Value

- 2.11 There are no AURN monitoring sites within 1 km of the development site with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2017a), which are used to report exceedances of the limit value to the EU, and which have been updated to support the 2017 Air Quality Plan identify exceedances of the limit value in 2015 along the A580 East Lancashire Road, approximately 500 m north of the Allocation Site. Defra's predicted concentrations for future years, presented for three scenarios ('baseline', 'with CAZs' and 'with CAZs and additional actions' – the latter two taking account of the measures contained in its 2017 Air Quality Plan (Defra, 2017b)), do not identify any exceedances within the study area. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational.
- 2.12 As discussed in Paragraph 2.11, Defra has produced an Air Quality Plan (Defra, 2017b) to tackle roadside nitrogen dioxide concentrations in the UK. Within this Plan, the Greater Manchester Combined Authority is listed as an authority upon which the Government has placed legal duties to "develop and implement a plan designed to deliver compliance in the shortest time possible". Salford City Council is on this list due to exceedances of the EU limit value being identified beyond 2020 alongside several roads, though none of these roads are located within 1 km of the Allocation Site, thus future limit value exceedances are unlikely to be affected by any proposed development. The Greater Manchester Combined Authority is required to produce a local action plan which may include a CAZ, or other measures if they can deliver compliance as quickly as a CAZ, and might reasonably be expected to improve air quality within the study area.

Background Concentrations

- 2.13 Estimated 2017 background concentrations at the Allocation Site, derived from Defra's background maps (Defra, 2019b) are set out in Table 3; the background concentrations are all well below the objectives.

Table 3: Estimated Annual Mean Background Pollutant Concentrations in 2017 ($\mu\text{g}/\text{m}^3$)

Year	NO ₂	PM ₁₀	PM _{2.5}
2017	15.3-17.0	11.9-12.4	7.6-8.0
Objectives	40	40	25 ^a

^a The PM_{2.5} objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

3 Air Quality Constraints

- 3.1 Baseline conditions show air quality to be poor at locations adjacent to the M60 Manchester Outer Ring Road. An AQMA has been declared along this road corridor, as well as along small sections of the A572 Leigh Road.
- 3.2 The main air quality constraints associated with the development of the Allocation Site for residential use relate to the potential impacts of traffic emissions from the adjacent road network. The main air pollutants of concern related to traffic emissions are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}).
- 3.3 In addition, dust from the construction works has the potential to impact on residents and ecological receptors in the area.
- 3.4 In the design of the Masterplan, it will be necessary for consideration to be given to the proximity of new properties to the M60 and A572 to ensure that the proposed development does not lead to new exceedances of the national air quality objectives.

4 Future Detailed Air Quality Assessment

- 4.1 It will be necessary for a detailed air quality impact assessment to be carried out to support future planning applications for the proposed development of the Allocation site.
- 4.2 The development will lead to an increase in traffic on the local roads, which may impact on air quality at existing residential properties in an area of poor air quality. Taking into account the baseline conditions set out in Section 2, and air quality constraints identified in Section 3, it is envisaged that it will be necessary for the air quality assessment to address:

- the impacts of the operation of the proposed development on concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5} from road traffic in the proposed year of opening;
- the impacts of existing sources on future residents of the proposed development itself; and
- the impacts of the construction of the proposed development on dust soiling and concentrations of PM₁₀ during the construction period.

4.3 The Allocation Site is located near to Worsley Woods Local Nature Reserve (LNR) (located 1.2 km to the northeast, adjacent to the M60). Also, on roads which could be affected by an increase in traffic from the development of the Allocation Site, are Blackleach Country Park LNR, Clifton Country Park LNR and Clifton Wood Ancient Woodland. Increases in traffic on roads adjacent to these ecological sites have the potential to have an adverse impact; if required by Natural England or the Local Authority, it may be necessary to consider the air quality impact of the Allocation Site on these sites. Astley and Bedford Mosses Site of Special Scientific Interest (SSSI) and Manchester Mosses Special Area of Conservation (SAC) is also located approximately 3.7 km to the southwest of the Allocation Site, however, being located away from roads likely to be affected by an increase in traffic, it is not expected to be affected.

4.4 If the scheme includes a centralised energy plant (which includes a Combined Heat and Power (CHP) unit and/or large gas boilers, and/or emergency electricity generating plant), it will be necessary for the air quality assessment to consider the impact on existing local air quality, as well as new residents of the scheme itself.

4.5 The assessments should adopt the approaches recommended in best practice guidance. If required, measures to mitigate any significant air quality effects from the proposed development during both construction and operation should be recommended.

5 Summary Overview

5.1 The air quality constraints for the development of land east of Boothstown have been identified. Existing conditions within the study area show poor air quality, with concentrations of nitrogen dioxide above the annual mean objective at monitoring sites near to M60 Manchester Outer Ring Road. The Allocation Site lies within the Greater Manchester AQMA.

5.2 The main air quality constraints associated with the Allocation Site relate to future residents of new properties at the site, which will be subject to the impact of traffic emissions from the adjacent road network (namely the A572). In the Masterplan design it will be necessary for consideration to be given to the location of new properties with respect to these roads, to ensure the national air

quality objectives are not exceeded. This may require the inclusion of a “stand-off” zone along the road corridor¹.

- 5.3 Provided these air quality constraints are taken into account within the scheme design, the land east of Boothstown is considered suitable for housing development.
- 5.4 To support future planning applications, it will be necessary to carry out a detailed air quality assessment which considers both the impact of the proposed development at the Allocation Site on existing local air quality conditions (in terms of both human and ecological health), as well as the impact of existing pollution sources on the proposed development itself. With appropriate mitigation measures implemented as required², there should be no air quality constraints to the development of the Allocation Site for residential use.

¹ Pollutant concentrations decrease rapidly with increased distance from the kerbside.

² Pending the outcome of the air quality assessment, measures to reduce traffic generation on the local road network may be required to minimise air quality impacts at both existing residential properties and/or sensitive ecological sites.

6 References

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The Air Quality (England) (Amendment) Regulations, 2002, Statutory Instrument 3043 (2002), HMSO.

The Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000), HMSO.

7 Appendices

A1	National Air Quality Objectives	13
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A1 National Air Quality Objectives

- A1.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations 2000 (2000) and the Air Quality (England) (Amendment) Regulations 2002 (2002).
- A1.2 The objectives for nitrogen dioxide and PM₁₀ were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The PM_{2.5} objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m³ (Defra, 2016). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour PM₁₀ objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m³ (Defra, 2016). The predicted annual mean PM₁₀ concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM₁₀ objective. Where predicted annual mean concentrations are below 32 µg/m³ it is unlikely that the 24-hour mean objective will be exceeded.
- A1.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2016). The annual mean objectives for nitrogen dioxide and PM₁₀ are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour objective for PM₁₀ is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.
- A1.4 The European Union has also set limit values for nitrogen dioxide, PM₁₀ and PM_{2.5}. The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one (Directive 2008/50/EC of the European Parliament and of the Council, 2008). In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with

the limit values. Central Government does not recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded.

A1.5 The relevant air quality criteria for this assessment are provided in Table A1.1.

Table A1.1: Air Quality Criteria for Nitrogen Dioxide, PM₁₀ and PM_{2.5}

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m ³
Fine Particles (PM ₁₀)	24-hour Mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³ ^a
Fine Particles (PM _{2.5}) ^b	Annual Mean	25 µg/m ³

^a A proxy value of 32 µg/m³ as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM₁₀ objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM₁₀ objective are possible (Defra, 2016).

^b The PM_{2.5} objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.