



Air Quality Assessment: Toynbee Road and Romsey Close, Eastleigh

May 2023



Experts in air quality
management & assessment



Document Control

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Executive Summary

The air quality impacts associated with the proposed residential development on the land between Toynbee Road and Romsey Close in Eastleigh have been assessed. The development will consist of 83 retirement apartments and associated communal facilities, access, landscaping and car parking.

The proposed development will generate additional traffic on the local road network, however the trip generation associated with the proposed development is below the relevant published screening criteria. Therefore, the effect of the proposed development on local air quality will be 'not significant'.

Furthermore, there will be no significant point sources of emissions within the proposed development as heat and hot water will be provided via all-electric systems.

The suitability of the site for its proposed residential use has been considered and it has been demonstrated that pollutant concentrations at the proposed development will be below the relevant air quality objectives. Therefore, air quality for future users of the proposed development will be acceptable.

Overall, the operational air quality effects of the proposed development are judged to be 'not significant'.

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1 Introduction

- 1.1 This report describes the potential air quality impacts associated with the proposed residential development on the land between Toynbee Road and Romsey Close in Eastleigh. The proposed development will consist of 83 retirement apartments, including communal facilities, access and landscaping. The proposed development will also include up to 30 parking spaces for residents.
- 1.2 The proposed development is close to an Air Quality Management Area (AQMA) declared by Eastleigh Borough Council (EBC) for exceedances of the annual mean nitrogen dioxide (NO₂) objective. The proposed development will introduce new residential exposure into this area of potentially poor air quality, thus an assessment is required to determine the air quality conditions that future residents will experience. The proposed development will also generate additional traffic on local roads, which may impact on air quality at existing residential properties along the affected road network. The main air pollutants of concern related to road traffic emissions are NO₂ and fine particulate matter (PM₁₀ and PM_{2.5}).
- 1.3 The location and setting of the proposed development are shown in Figure 1, along with the location of the nearby Eastleigh AQMA and monitoring sites.



Figure 1: Proposed Development Setting in the Context of Air Quality

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- 1.4 The new homes within the proposed development will be provided with heat and hot water by an all-electric system; there will be no centralised combustion plant for the provision of energy and thus no significant point sources of emissions within the proposed development.
- 1.5 This report describes existing local air quality conditions in 2019 (the latest year of available monitoring prior to the impact of the Covid-19 pandemic¹), and those in the earliest year of occupation (2025). This report has been prepared taking into account all relevant local and national guidance and regulations.

¹ The influence of restrictions introduced as a result of the pandemic has generally been to reduce concentrations of the pollutants considered in this assessment.

2 Policy Context

- 2.1 All European legislation referred to in this report is written into UK law and remains in place.

Air Quality Strategy

- 2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an AQMA, and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Clean Air Strategy 2019

- 2.3 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

- 2.4 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the Government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see 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.
- 2.5 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has since announced that the phase-out date for the sale of new petrol and diesel cars and vans will be brought forward to 2030 and that all new cars and vans must be fully zero emission at the tailpipe from 2035. If these ambitions are realised then road traffic-related NO_x emissions can be expected

to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

Environment Act 2021

- 2.6 The UK's new legal framework for protection of the natural environment, the Environment Act (2021) passed into UK law in November 2021. The Act gives the Government the power to set long-term, legally binding environmental targets. It also establishes an Office for Environmental Protection (OEP), responsible for holding the Government to account and ensuring compliance with these targets.
- 2.7 Under the Act, the Government has recently published two new targets for future concentrations of PM_{2.5}. These are described in Paragraph 3.5.

Planning Policy

National Policies

- 2.8 The National Planning Policy Framework (NPPF) (2021) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:
- “to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy”.*
- 2.9 To prevent unacceptable risks from air pollution, Paragraph 174 of the NPPF states that:
- “Planning policies and decisions should contribute to and enhance the natural and local environment by...preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality”.*
- 2.10 Paragraph 185 states:
- “Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development”.*
- 2.11 More specifically on air quality, Paragraph 186 makes clear that:

“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan”.

- 2.12 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

“Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified”.

- 2.13 Regarding plan-making, the PPG states:

“It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality”.

- 2.14 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan *“identifies measures that will be introduced in pursuit of the objectives and can have implications for planning”.*

- 2.15 Regarding the need for an air quality assessment, the PPG states that:

“Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity”.

- 2.16 The PPG sets out the information that may be required in an air quality assessment, making clear that:

“Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific”.

- 2.17 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

“Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented”.

Local Policies

- 2.18 The Eastleigh Borough Local Plan (2016-2036) was adopted by EBC in April 2022 and sets out the plans and policies to guide future development in Eastleigh up to 2036 (EBC, 2022a). Within this Plan, there is one main policy which refers to air quality. Policy DM8 refers to Pollution and states that:

“1. Development will not be permitted if it is likely to cause loss of amenity or impact on public health or other unacceptable environmental impacts through: a. air pollution (including odours or particulate emissions)...

2. Development susceptible to particular forms of pollution will not be permitted: a. where it will be adversely affected by such pollution, unless measures can be taken that adequately mitigate the polluting effects...”

Building Standards

- 2.19 Part F(1) of Schedule 1 of the Building Regulations 2010 as amended June 2022 (Ministry of Housing, Communities & Local Government, 2022) places a duty on building owners, or those responsible for relevant building work², to ensure adequate ventilation is provided to building occupants.
- 2.20 Approved Document F (HM Government, 2021a), which accompanies the Building Regulations, explains that care should be taken to minimise entry of external air pollutants. Specific steps should be taken to manage ventilation intakes where the building is near to a significant source of emissions, or if local ambient concentrations exceed values set in the Air Quality Standards Regulations 2010 (see Paragraph 3.6, later). These steps include maximising the distance between emission source

² Building work is a legal term for work covered by the Building Regulations. With limited exemptions, the Regulations apply to all significant building work, including erecting or extending a building.

and air intake, considering likely dispersion patterns, and considering the timing of pollution releases when designing the ventilation system.

- 2.21 Part S(1) of Schedule 1, and Regulation 44D, of the Building Regulations 2010 (Ministry of Housing, Communities & Local Government, 2022) define a requirement for the provision of infrastructure for charging electric vehicles. Precise requirements are explained further within Approved Document S (HM Government, 2021b) and depend on the overall number of parking spaces provided and the average financial cost of installation.
- 2.22 Compliance with the Building Regulations is not required for planning approval, but it is assumed that the Regulations will be complied with in the completed building.

Air Quality Action Plans

National Air Quality Plan

- 2.23 Defra has produced an Air Quality Plan to tackle roadside NO₂ concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a CAZ. There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

- 2.24 EBC's Air Quality Action Plan (EBC, 2020) sets out a series of measures to improve air quality in Eastleigh between 2020 and 2025. These measures are grouped by the following themes:
- environment – including monitoring of pollutant concentrations and promoting the use of electric vehicles;
 - transport – including sustainable transport infrastructure and promoting alternatives to private vehicle use;
 - health and social policy – including health based public information campaigns and promoting active travel alternatives through school and community projects;

- housing – including planning and policy guidance; and,
- economy and regeneration – including workplace schemes and travel planning.

2.25 The main measures of relevance to this assessment are measures HOU1.1-1.5, which aim to update resident parking policies and planning guidance for new developments to include requirements for EV charging, low NOx boilers, green infrastructure and sustainable transport. However, these parking policies and the updated Planning SPD for Air Quality have not been published and therefore these measures have not been considered further within this assessment.

3 Assessment Criteria

- 3.1 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) and the Air Quality (England) (Amendment) Regulations (2002).
- 3.2 The UK-wide objectives for NO₂ and PM₁₀ were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. Measurements across the UK have shown that the 1-hour NO₂ objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m³ (Defra, 2022). Measurements have also shown that the 24-hour mean PM₁₀ objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m³ (Defra, 2022).
- 3.3 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, 2022). The annual mean objectives for NO₂ and PM₁₀ are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean 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 NO₂ applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.
- 3.4 Defra has also set objectives and targets for concentrations of PM_{2.5}. The objective for PM_{2.5} is not set in regulations and there is no requirement for local authorities to meet it. Because this objective is not set in regulations, it is not formally defined. It was originally set as an annual mean concentration of 25 µg/m³ but, following changes to the limit value for PM_{2.5} (see Paragraph 3.6) through the EU Exit Regulations 2020, a value of 20 µg/m³ is now commonly used.
- 3.5 Defra has also recently published two new targets for PM_{2.5} concentrations in England. One target is to achieve PM_{2.5} concentration of 10 µg/m³ by 2040. This is accompanied by a second target to reduce overall population exposure to PM_{2.5}, which will be assessed by national government using its own measurements. Defra recognises that the nature of PM_{2.5} concentrations, which are dominated by long-range emissions, mean that only coordinated national-level action can allow it to achieve these targets by 2040. Furthermore, the difficulty of predicting PM_{2.5} concentrations in 2040 (AQEG, 2021) usually prevents any meaningful individual local-scale assessment. As such, the

targets provide metrics against which central Government can assess its own progress. Defra has not set the targets in expectation that individual local authorities will use them to assess compliance, or that they will be used explicitly within development-control decisions. Defra's focus for local authorities is on reducing emissions which will help to drive national-level improvements, rather than addressing PM_{2.5} concentrations in their own area. Similarly, in terms of planning decisions, it is most sensible to focus on optimising development to reduce emissions and exposure.

- 3.6 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for NO₂, PM₁₀ and PM_{2.5}, and is implemented in UK law through the Air Quality Standards Regulations (2010)³. The limit values for NO₂, PM₁₀ and PM_{2.5} are the same numerical concentrations as the UK objectives, but achievement of the limit values is a national obligation rather than a local one. 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 normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).
- 3.7 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for NO₂, PM₁₀ and PM_{2.5}

Pollutant	Time Period	Objective
NO ₂	1-hour Mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m ³
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
PM _{2.5} ^a	Annual Mean	20 µg/m ³

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

Screening Criteria

- 3.8 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)⁴ recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A1, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m² of floor space or

³ As amended through The Air Quality Standards (Amendment) Regulations 2016 and The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

⁴ The IAQM is the professional body for air quality practitioners in the UK.

cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.

- 3.9 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A1) inside an AQMA are a change in flows of more than 25 heavy duty vehicles (HDVs) or 100 light duty vehicles (LDVs) per day; outside of an AQMA the thresholds are 100 HDVs or 500 LDVs. The guidance notes that *“the criteria should not be applied rigidly; in some instances it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality”*.
- 3.10 The criteria are more stringent where the impacts may arise on roads where concentrations are close to, or above the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where measured roadside concentrations are below 90% of the objective, the less stringent criteria are likely to be more appropriate.

4 Assessment Approach

Existing Conditions

4.1 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:

- industrial sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2023a);
- local sources have been identified through examination of the Council's Air Quality Review and Assessment reports;
- information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority;
- background concentrations have been defined using Defra's 2018-based background maps (Defra, 2023d). These cover the whole of the UK on a 1x1 km grid. The background annual mean NO₂ maps for 2019 have been calibrated against concurrent measurements from national monitoring sites (AQC, 2020). The calibration factor calculated has also been applied to future year backgrounds. Mapped background concentrations of PM₁₀ and PM_{2.5} have not been adjusted; and
- whether or not there are any exceedances of the annual mean limit value for NO₂ in the study area has been identified using the maps of roadside concentrations published by Defra (2020) (2023b). These are the maps used by the Government, together with the results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to the required data quality standards, to identify and report exceedances of the limit value. The national maps of roadside PM₁₀ and PM_{2.5} concentrations (Defra, 2023b), which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

Road Traffic Impacts

4.2 The change in vehicle traffic associated with the proposed development has been screened against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraphs 3.8 to 3.10, and detailed further in Appendix A1. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Impacts of Road Traffic on Future Residents of the Proposed Development

4.3 The impacts of NO₂, PM₁₀ and PM_{2.5} concentrations on new residents of the development have been assessed qualitatively, taking account of local air quality monitoring data and proximity to local road traffic emissions.

- 4.4 The assessment examines air quality conditions in 2019 and assumes these are representative of air quality conditions at the time the development is occupied; this assumption is considered worst-case as it is generally expected that NO₂, PM₁₀ and PM_{2.5} concentrations will decline in future years, and the anticipated earliest year of occupation of the proposed development is 2025.

Assessment of Significance

- 4.5 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by EPUK/IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement; the experience of the consultants preparing the report is set out in Appendix A2. Full details of the EPUK/IAQM approach are provided in Appendix A1.

5 Baseline Conditions

Relevant Features

- 5.1 The proposed development is located approximately 450 m to the west of Eastleigh train station. The site, which is bounded by Romsey Close and Toynbee Road, is located in a residential area and is surrounded by multiple properties. Eight residential properties are currently located within the site boundary (which will be demolished as part of the development). A primary school (the Crescent Primary School) is located approximately 10 m west of the site boundary.
- 5.2 The proposed development is located north of the Eastleigh AQMA No. 1, as highlighted in Figure 1.

Industrial Sources

- 5.3 No significant industrial sources have been identified that are likely to affect the proposed development, in terms of air quality.

Local Air Quality Monitoring

- 5.4 EBC operates three automatic monitoring stations within its area, one of which is located approximately 80 m south of the proposed development at the Point on Leigh Road (ES3). The Council also operates a number of NO₂ monitoring sites using diffusion tubes prepared and analysed by Gradko International (using the 20% TEA in water method). There are seven diffusion tube sites within 1 km of the proposed development, the closest of which is located on the A335 Leigh Road.
- 5.5 Annual mean results for the years 2015 to 2020⁵ are summarised in Table 2, while results relating to the 1-hour mean objective are summarised in Table 3. The monitoring locations are shown in Figure 2. Monitoring data for years earlier than 2020 have been taken from EBC's 2020 Annual Status Report (EBC, 2020), while data for 2020 has been downloaded from the EBC my-air website (EBC, 2022b).

⁵ While 2020 results have been presented in this Section for completeness, they are not relied upon in any way as they will not be representative of 'typical' air quality conditions due to the considerable impact of the Covid-19 pandemic on traffic volumes and thus pollutant concentrations.

Table 2: Summary of Annual Mean NO₂ Monitoring (2015-2020) (µg/m³)^a

Site No.	Site Type	Location	2015	2016	2017	2018	2019	2020
ES3	Roadside	The Point	-	37.0	33.0	31.0	25.6	20.0
ES1	Roadside	Southampton Road	-	40.8	37.4	37.8	34.1	26.0 ^b
LRPR	Roadside	Leigh Road / Pluto Road	30.2	32.4	31.9	32.9	31.6	23.9
WA	Roadside	Woodside Avenue	34.1	35.9	34.0	35.0	31.5	26.0
MS	Roadside	Mill Street	28.6	31.2	28.9	32.1	26.4	22.9
BR2	Roadside	Bishopstoke Road 2	33.3	33.0	39.5	31.7	31.3	26.8
TW	Roadside	Twyford Road	25.2	28.3	26.5	27.5	24.7	22.5
SR2	Roadside	Southampton Road 2	-	-	-	42.7	37.6	31.7
PA	Roadside	Passfield Avenue	-	31.5	27.5	30.0	26.1	21.0
Objective			40					

^a Exceedances of the objectives are shown in bold.^b Data capture less than 75%**Table 3: Number of Hours With NO₂ Concentrations Above 200 µg/m³**

Site No.	Site Type	Location	2015	2016	2017	2018	2019	2020
ES3	Roadside	The Point	-	0	0	0	0	0
ES1	Roadside	Southampton Road	-	4	0	0	0	0 ^a
Objective			18					

^a Data capture less than 75%

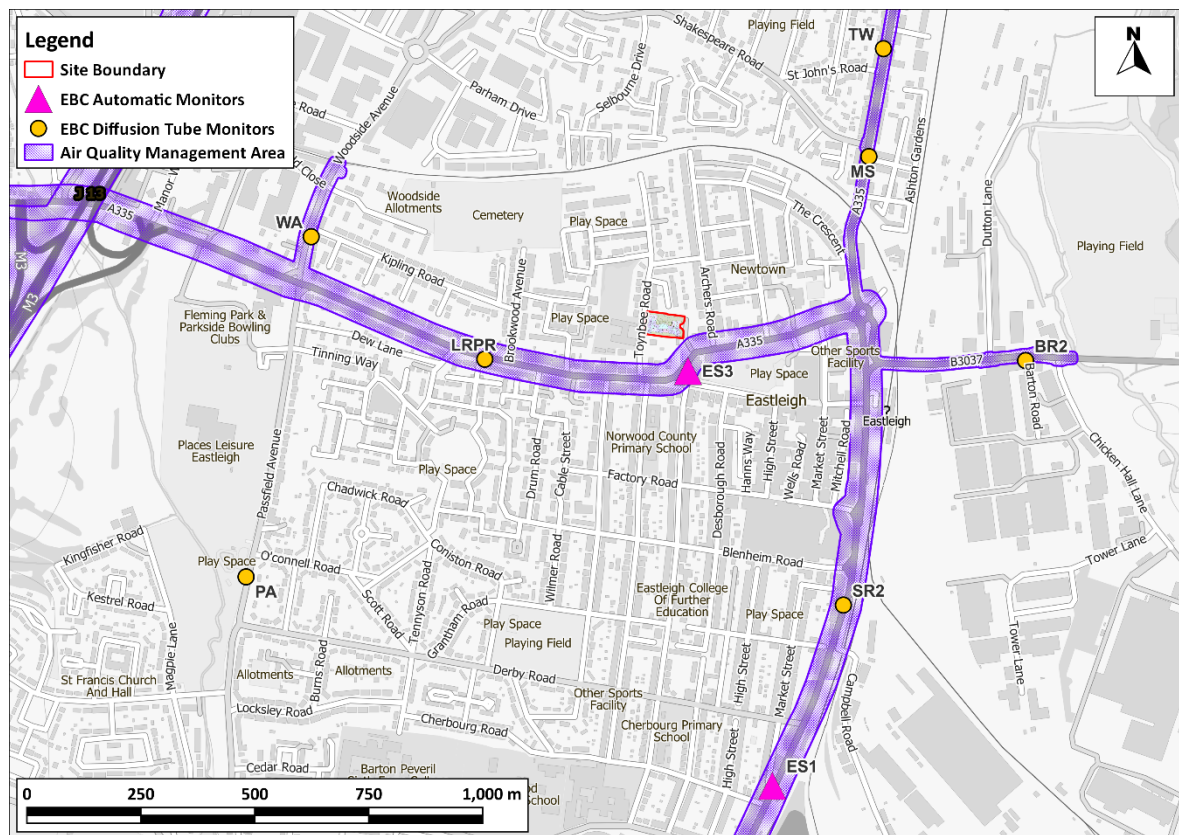


Figure 2: Monitoring Locations

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- 5.6 Annual mean NO₂ concentrations between 2015 and 2019 were below the objective at all roadside monitoring sites within 1 km of the proposed development, except at site SR2 in 2018 and ES1 in 2016.
- 5.7 Measured annual mean NO₂ concentrations at all nearby diffusion tube monitoring sites have been well below 60 µg/m³ since 2015, indicating that the 1-hour mean objective was met at each of the monitoring sites (Paragraph 3.2). Direct measurements of 1-hour mean concentrations at both automatic monitoring sites confirm that the objective was met in all recent years.
- 5.8 There is an overall downward trend in concentrations measured at all but one of the monitoring sites within 1 km of the proposed development between 2015 and 2019, indicating an improvement in local air quality in the vicinity of the proposed development in recent years.
- 5.9 The Southampton Road roadside automatic monitoring station, located adjacent to the A335 approximately 1.1 km south of the proposed development, is the only automatic monitor in Eastleigh

which measures PM₁₀ concentrations. Annual mean results for the years 2015 to 2020 are summarised in Table 4, while results relating to the daily mean objective are summarised in Table 5. Concentrations were well below the relevant objectives in all years.

- 5.10 The Southampton Road monitor also began measuring PM_{2.5} concentrations in early 2020 but data capture rates have been low so the PM_{2.5} data for this site has not been presented. However, EBC have estimated likely PM_{2.5} levels in Eastleigh from measured PM₁₀ levels and concluded that the annual mean PM_{2.5} objective is unlikely to be exceeded within the Borough (EBC, 2020).

Table 4: Summary of Annual Mean PM₁₀ Monitoring (2015-2020) (µg/m³)

Site No.	Site Type	Location	2015	2016	2017	2018	2019	2020
PM₁₀								
ES1	Roadside	Southampton Road	-	22.2	20.9	22.5	21.2	18.0 ^a
Objective			40					

^a Data capture less than 75%

Table 5: Number of Days With PM₁₀ Concentrations Above 50 µg/m³

Site No.	Site Type	Location	2015	2016	2017	2018	2019	2020
ES1	Roadside	Southampton Road	-	7	7	0	4	0 ^a
Objective			35					

^a Data capture less than 75%

Exceedances of Limit Value

- 5.11 There are no AURN (Defra, 2023c) monitoring sites within 1 km of the application site with which to identify exceedances of the annual mean NO₂ limit value. Defra's roadside annual mean NO₂ concentrations (Defra, 2023b), which are used to identify and report exceedances of the limit value, do not identify any exceedances within 1 km of the application site in 2019. As such, there is considered no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational in 2025.

Background Concentrations

- 5.12 Estimated background concentrations at the proposed development for 2019 (to align with the latest year of available monitoring data) and the earliest opening year (2025) are set out in Table 6. The concentrations are all well below the objectives.

Table 6: Estimated Annual Mean Background Pollutant Concentrations in 2019 and 2025 ($\mu\text{g}/\text{m}^3$)

Year	NO ₂	PM ₁₀	PM _{2.5}
2019	19.1	15.3	10.8
2025	15.3	14.1	9.9
Objective	40	40	20 ^a

^a The 20 $\mu\text{g}/\text{m}^3$ PM_{2.5} objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

6 Impact Assessment

Impacts at Existing Receptors

- 6.1 The project Transport Consultants, Paul Basham Associates, have confirmed that the proposed development will generate a total of 165 daily LDV trips as an Annual Average Daily Traffic (AADT flow); all of these trips will be generated on Toynbee Road to the south of the proposed development. This daily trip rate is above the screening threshold of 100 LDVs recommended for use within or adjacent to an AQMA in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraph 3.9). At the junction with A335 Leigh Road, 50% of trips will travel east and 50% will travel west (83 LDVs in each direction). There is therefore only one, approximately 100 m section of Toynbee Road which will be above the most stringent EPUK/IAQM screening criteria.
- 6.2 While the 100 LDV screening threshold for within an AQMA is exceeded on a section of Toynbee Road, the guidance states that *“the presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate”*.
- 6.3 As presented in Table 2, measured annual mean NO₂ concentrations at nearby automatic monitoring site ES3 have been below the objective between 2015 and 2020; in 2019 (the last year full year of monitoring data unaffected by the Covid-19 pandemic), concentrations at ES3 was 25.6 µg/m³. As Toynbee Road is minor residential road, existing vehicle flows will be lower on this road than A335 Leigh Road (a major A road), and therefore concentrations are expected to be lower than those monitored at ES3.
- 6.4 Therefore, in accordance with the EPUK/IAQM guidance, although the southern section of Toynbee Road is located within an AQMA, as concentrations in this area of the AQMA are below 90% of the objective, the application of the higher screening threshold of 500 LDVs is judged to be most appropriate. Based on the predicted LDV trips of 165 AADT on Toynbee Road, the screening criteria will not be exceeded as a result of the proposed development. On all other roads, inside and outside the AQMA, LDV trips associated with the proposed development will be below the more stringent 100 LDV threshold.
- 6.5 With respect to HDVs, the proposed development will expected to generate up to eight operational HDV trips as an AADT; this trip rate is well below both the 100 HDV and the more stringent 25 HDV thresholds.
- 6.6 As such, in accordance with EPUK/IAQM guidance there is no requirement for a detailed assessment of road traffic impacts at existing receptors; it can be concluded that the proposed development will not have a significant impact on local roadside air quality.

Impacts on Future Occupants of the Development

- 6.7 As previously discussed in Section 5, the proposed development is located outside the Eastleigh AQMA on minor residential roads. The majority of monitoring sites in the vicinity of the proposed development are located at roadside locations on major A roads, within the Eastleigh AQMA. These monitoring sites experience greater traffic flows and pollutant concentrations than the minor residential roads the proposed development is located adjacent to. Measured annual mean and 1-hour mean NO₂ concentrations at all monitoring sites within 1 km of the proposed development were below the respective objectives in 2019. As such, annual and 1-hour mean NO₂ concentrations at the proposed development are also expected to be below the objective.
- 6.8 Measured concentrations of PM₁₀ at the nearby automatic monitoring site located on a major A road in the Eastleigh AQMA have also been below the respective objectives in recent years and EBC has estimated that PM_{2.5} levels in Eastleigh are unlikely to exceed the annual mean objective. As such, it is reasonable to conclude that PM₁₀ and PM_{2.5} concentrations at the proposed development will also be below the respective objectives.
- 6.9 Measured pollutant concentrations are expected to continue to reduce in future years due to improvements in emissions standards, increased uptake of low emissions vehicles and the implementation of local and national measures, including those outlined in the EBC's Air Quality Action Plan.
- 6.10 Defra's Technical Guidance (Defra, 2022) states that "*concentrations fall-off rapidly on moving away from the source*", and defines urban background monitoring locations as being 50 m from major sources of pollution. The proposed development boundary is located a minimum of 30 m from the A335, which is the main source of pollution, with the majority of the site over 50 m from the main road. Background NO₂, PM₁₀ and PM_{2.5} concentrations (Table 6) are well below the objectives at the proposed development site in both 2019 and 2025.
- 6.11 Taking the above into account, it is judged that future users of the proposed development will experience acceptable air quality.

Significance of Operational Air Quality Effects

- 6.12 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A1, and takes account of the assessment that:
- pollutant concentrations within the proposed development will be below the objectives, thus future residents will experience acceptable air quality; and,
 - the additional vehicles generated by the proposed development will be below recognised screening criteria, and the proposed development will not introduce any combustion plant

to provide heat and power. Therefore, the proposed development will have an insignificant effect on local air quality.

7 Mitigation

Good Design and Best Practice

7.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The EPUK/IAQM guidance predates the recent publication by Defra of future air quality targets for PM_{2.5}. As explained in Paragraph 3.5, meeting the new target will require positive action from many different sectors. While it is not appropriate to determine individual planning applications based on whether future PM_{2.5} concentrations in an area will be above or below the concentration target, it is nevertheless appropriate that new development contributes to meeting the national targets by ensuring that air quality is taken into account in development design. The proposed development incorporates the following good design and best practice measures:

- provision of electric vehicle charging points;
- provision of cycle storage to encourage the use of sustainable modes of transport; and,
- provision of heat and electricity through an all-electric system to avoid the need for on-site combustion.

Recommended Mitigation

- 7.2 The assessment has demonstrated that the overall air quality effect of the proposed development will be 'not significant'; it will not introduce any new exposure into areas of unacceptable air quality, nor will the development-generated traffic emissions have a significant impact on local air quality. It is, therefore, not considered appropriate to propose further mitigation measures for this development.
- 7.3 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law). EBC's Air Quality Action Plan will also be helping to deliver improved air quality.

8 Conclusions

- 8.1 The assessment has considered the impacts of the proposed development on local air quality with respect to emissions from road traffic generated by the completed and occupied development. It has also identified the air quality conditions that future occupants will experience. The assessment has been based on measurements made during 2019 and assumes these are representative of air quality conditions at the time the development is occupied. This assumption is considered worst-case as it is generally expected that NO₂, PM₁₀ and PM_{2.5} concentrations will decline in future years.

Impacts

- 8.2 The assessment has demonstrated that the incremental changes to traffic flows on the local road network are below the relevant EPUK/IAQM screening thresholds, and therefore the effects of road traffic on local air quality will be insignificant.
- 8.3 The assessment has also demonstrated that pollutant concentrations will be well below the objectives at the proposed development, and therefore that future users will experience acceptable air quality.
- 8.4 The overall operational air quality effects of the proposed development are judged to be 'not significant'.

Policy Implications

- 8.5 Taking into account these conclusions, it is judged that the proposed development is consistent with Paragraph 185 of the NPPF, being appropriate for its location both in terms of its effects on the local air quality environment and the air quality conditions for future residents. It is also consistent with Paragraph 186, as it will not affect compliance with relevant limit values or national objectives.
- 8.6 The proposed development is also consistent with Policy DM8 of EBC's Local Plan as it will not result in an "*unacceptable environment impact*", nor will the occupants of the proposed development be adversely affected by existing air pollution.

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10 Glossary

AADT	Annual Average Daily Traffic
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EPUK	Environmental Protection UK
EU	European Union
EV	Electric Vehicle
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
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
kph	Kilometres Per hour
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
LGV	Light Goods Vehicle
µg/m³	Microgrammes per cubic metre
NO	Nitric oxide
NO₂	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be NO ₂ + NO)
NPPF	National Planning Policy Framework
OEP	Office for Environmental Protection

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
OLEV	Office for Low Emission Vehicles
PM₁₀	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
PPG	Planning Practice Guidance
RDE	Real Driving Emissions
SPD	Supplementary Planning Document
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide
WHO	World Health Organisation

11 Appendices

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A1 EPUK & IAQM Planning for Air Quality Guidance

- A1.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

“Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations”.*

Recommended Best Practice

- A1.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

“The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions”.

- A1.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m² of commercial floorspace;
- are carried out on land of 1 ha or more.

- A1.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new “street canyon”, as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) “rapid charge” point per 10 residential dwellings and/or 1000 m² of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNO_x/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
 - Spark ignition engine: 250 mgNO_x/Nm³;
 - Compression ignition engine: 400 mgNO_x/Nm³;
 - Gas turbine: 50 mgNO_x/Nm³.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNO_x/Nm³ and 25 mgPM/Nm³.

A1.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

“It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the “damage cost approach” used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential”.

A1.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

“There may be a requirement to carry out an air quality assessment for the impacts of the local area’s emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- the presence of a source of odour and/or dust that may affect amenity for future occupants of the development”.*

Impacts of the Development on the Local Area

A1.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m² of floor space for all other uses or a site area greater than 1 ha.

A1.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A1.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A1.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A1.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

“Typically, any combustion plant where the single or combined NO_x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm³.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable”.

- A1.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

“The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive ‘trigger’ for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality”.

- A1.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

“The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer”.

- A1.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

- A1.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

- A1.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either ‘significant’ or ‘not significant’. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A1.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A1.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A2.

A2 Professional Experience

Dr Denise Evans, BSc (Hons) PhD MEnvSc MIAQM

Dr Evans is an Associate Director with AQC, with more than 23 years' relevant experience. She has prepared air quality review and assessment reports for local authorities, and has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has extensive modelling experience, completing air quality and odour assessments to support applications for a variety of development sectors including residential, mixed use, urban regeneration, energy, commercial, industrial, and road schemes, assessing the effects of a range of pollutants against relevant standards for human and ecological receptors. Denise has acted as an Expert Witness and is a Member of the Institute of Air Quality Management.

Julia Burnell, MEnvSci (Hons) MEnvSc MIAQM

Miss Burnell is a Senior Consultant with AQC with over six years' experience in the field of air quality. She has experience of undertaking a range of air quality assessments for power, transportation, and mixed-use development projects both in the UK and internationally. She is also experienced at preparing environmental permit applications for medium combustion plant/specified generator sites and has commissioned and maintained numerous ambient air quality monitoring surveys. Prior to her work with AQC, Julia completed an MEnvSci (Hons) in Environmental Science (four-year integrated master's). She is a Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.