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IAQM Institute of Air Quality Management

Land-Use Planning & Development Control: Planning For Air Quality

Guidance from Environmental Protection UK and the Institute of Air Quality Management on dealing with air quality within the land-use planning and development control processes.

Consultation document. December 2014

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Acknowledgements

Disclaimer: This guidance was produced as a result of the voluntary contribution of individuals within the Working Group, who are members of EPUK and/or IAQM, for which both organisations are grateful. Whilst this guidance represents a consensus view of the Working Group, it does not necessarily represent the view of individual members.

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Graphic Design: Darren Walker (darrengraphidesign.com)

Suggested citation: Moorcroft, S. et al. (2015) Land-use Planning & Development Control: Planning for Air Quality. Institute of Air Quality Management, London

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Date: December 2014

Cover image: stank o07

1. Purpose and structure of this guidance

1.1 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have produced this guidance to ensure that air quality is adequately considered in the land-use planning and development control processes.

1.2 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. This guidance focuses on development control, but also stresses the importance of having good air quality policies within local authority planning frameworks.

1.3 The intended audience for this guidance is made up of air quality and planning officers within local authorities, and developers and consultants involved in the preparation of development proposals and planning applications.

1.4 The guidance sets out why air quality is an important consideration in many aspects of local authority spatial planning. It emphasises how good spatial planning can reduce exposure to air pollution, as well as providing other benefits of well-being to the wider community. It also emphasises the importance of applying good design and best-practice measures to **all developments**, to both reduce pollutant emissions and human exposure. It also provides guidance on how air quality considerations of individual schemes may be considered within the development control process.

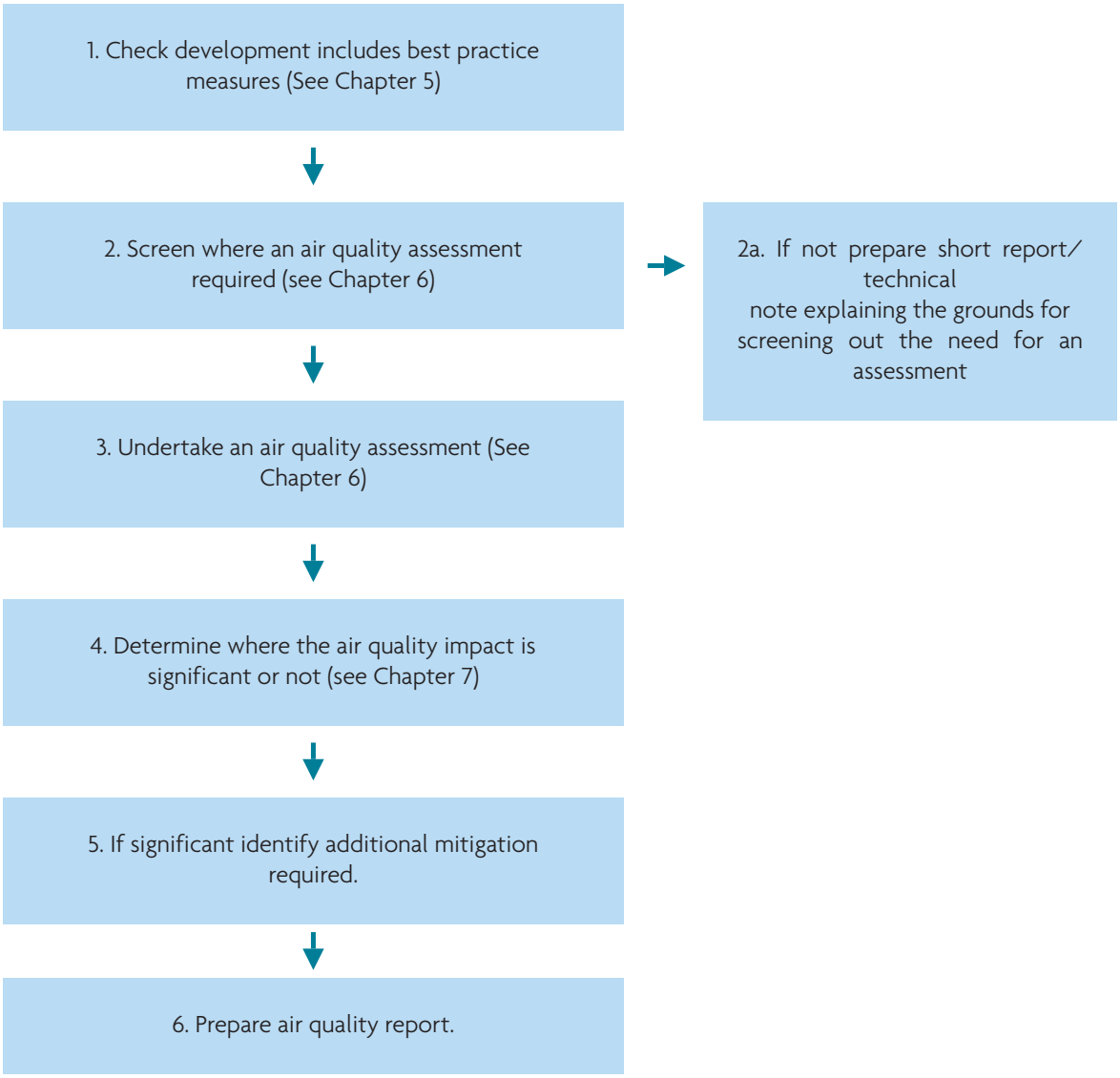
1.5 Chapters 1 to 4 of this guidance set out the role of the planning regime, the important links between air quality and human health, and the links between planning and environmental assessment. Chapters 5 to 8 then describe the roles of the local authority and developer/applicant in the process through which air quality and planning decisions are taken. More specifically, Chapter 5 deals with the overarching concepts of land-use planning and air quality that should be applied throughout the strategic planning and development control processes; it emphasises that best practice[1] and a minimum standard of mitigation should be applied to **all developments**. Chapters 6 to 8 then deal with the assessment of individual planning applications; the approach set out herein is founded on the concept that the principles set out in Chapter 5 are firmly adhered to, but recognises that within the development control process, decisions have to be made by local planning authorities on a case-by-case basis. A flow chart describing the overall process through Chapters 5 to 8 is shown below in Figure 1.

1.6 This guidance is not intended to cover the specific assessment of odour or construction dust effects that some developments may give rise to. Separate guidance has been published by IAQM i.e. 'Guidance on the assessment of odour for planning 'and 'Guidance on the assessment of dust from demolition and construction' and these guidance documents should be consulted as appropriate[2].

1.7 This guidance document applies to the planning system in England and Wales. It is intended that a separate document will be adapted for use in the Scottish and/or Northern Ireland planning systems. Meanwhile, it is considered that the general principles of air quality assessment set out herein are applicable in all parts of the United Kingdom.

[1] Best practice in this guidance implies those measures which are currently considered to be the best available – this does not preclude better practice in the future.
[2] http://iaqm.co.uk/guidance

Figure 1: Air Quality Assessment Procedure for new developments



2. The Role of the Planning Regime

2.1 Land-use planning can play a critical role in improving local air quality. At the strategic level, spatial planning can provide for more sustainable transport links between the home, workplace, educational, retail and leisure facilities, and identify appropriate locations for potentially polluting industrial development.

2.2 The pattern of land use determines the need for travel, which is in turn a major influence on transport related emissions. Decisions made on the allocation of land use will dictate future emissions, as many people and businesses will make significant use of road transport for journeys between places that form part of their daily lives. Suppressing this demand for travel by road can only be achieved by having a plan that recognises this demand. Considering the merits of individual development proposals in isolation is less likely to deliver a pattern of land use that is more sustainable. Ideally, planning authorities should have policies that reflect the desirability of reducing the demand for road journeys with polluting vehicles. Local Transport Plans, prepared in England by strategic transport authorities, contain some of this thinking and are required to consider mechanisms for reducing the need for travel.

2.3 Policies that promote high quality building standards, reduce energy use, and require the preparation of low emissions strategies, can help to reduce local emissions of air pollutants. They will also align with other policies aimed at increasing sustainability, notably for reducing greenhouse gas emissions.

2.4 Development is not inherently negative for air quality. Whilst a new development at a particular site may have its own emissions, it also brings an opportunity to reduce overall emissions in an area by installing new, cleaner technologies and applying policies that promote sustainability. The installation of more efficient low NOx boilers is one obvious example.

2.5 The National Planning Policy Framework (NPPF) in England, and Planning Policy Wales (PPW), set out the important role of local authorities as contributing to the protection of and enhancement of the environment. As part of this role they should help to improve biodiversity, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy. It requires local authorities to grant planning permission in conformity with NPPF/PPW and the local plan, where there are no relevant policies or where these are out of date, unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits.

2.6 Specifically, planning policies should sustain compliance with, and contribute towards meeting EU limit values or national objectives for air pollutants[3], taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in an Air Quality Management Area is consistent with the local air quality action plan.

2.7 Local authorities therefore need to set out their policies to achieve good air quality, both within Air Quality Management Areas and more widely across their districts and periodically to review them to keep them relevant and up to date.

2.8 Many authorities have already done so and have included these in their air quality action plans, supplementary planning documents or within other documents.

[3] The air quality objectives for England are defined in the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002; within Wales they are defined in the Air Quality (Wales) Regulations 2000 and the Air Quality (Wales) (Amendment) Regulations 2002. The EU Limit Values are transposed into UK legislation within the Air Quality Standards Regulations 2010.

3. Links between poor air quality, human health and the environment

3.1 Planning has an important influence on air quality and also, therefore, the health of humans and ecosystems. Ideally, air quality should be a prime consideration for long term planning, so that land is used and allocated in ways that minimise emissions and that reduce the exposure of people to air pollution. As a minimum, the planning system should take decisions on individual proposals that do not lead to poor air quality, nor should it make a series of decisions that collectively produces this undesirable outcome. The best means of ensuring that this does not occur is to have sound policies in place that guide decision making. This document explains what those desirable policies might be to promote better air quality and how individual proposals are best evaluated.

3.2 It is now beyond dispute that air quality is a major influence on public health and so improving air quality will deliver real benefits. In England, with the move of Directors of Public Health into local authorities, along with the creation of Health and Wellbeing Boards and Joint Strategic Needs Assessments, there is another opportunity to refresh the collaboration between planning, environmental health and public health so that collective decisions can be made that influence both air quality and health positively.

3.3 In the UK it has been estimated that the mortality burden of long term exposure to particulate matter ($PM_{2.5}$) in 2008 was equivalent to nearly 29,000 premature deaths in those aged 30 or older.[4] The Public Health Outcomes Framework data tool shows the fraction of mortality attributable to air pollution by local authority (range 2.7 - 8.3%, average for England 5.4%).[5] It is likely that removing exposure to all $PM_{2.5}$ would have a bigger impact on life expectancy in England and Wales than eliminating passive smoking or road traffic accidents[6]. The economic cost from the impacts of air pollution in the UK is estimated at £9-19 billion every year which is comparable to the economic cost of obesity (over £10 billion)[7]. The International Agency for Research on Cancer has recently identified outdoor air pollution as a human carcinogen.[8]

3.4 Nitrogen dioxide can also, independently of particulate matter, play an adverse role in exacerbating asthma, bronchial symptoms (even in healthy individuals), lung inflammation and reduced lung function. Reduced lung function growth is also linked to nitrogen dioxide exposure at concentrations currently found in many urban areas. There is also increasing evidence, as summarised in the HRAPIE review by the WHO[9] , that chronic exposure to NO_2 may be important for premature mortality effects, but the evidence for an association that is suitable for quantification of the impacts is less strong than for particles. It is not yet considered by the Committee on the Medical Effects of Air Pollutants to be sufficiently convincing for this purpose. The strength of the association proposed by the HRAPIE review is such that it is comparable to that of $PM_{2.5}$, but only above a threshold of 20 $\mu g/m^3$.

3.5 Emissions of some airborne pollutants are known to damage the health of ecosystems, often in subtle and long term ways. Much more is now known about the effects of excess acidity and nutrient nitrogen on plants, which have been taking place over a long period of time. Many sensitive areas of the UK are still adversely affected and are in an unfavourable condition, despite the reduction in national emissions of SO_2 and NOx. Agriculture is a dominant source of ammonia emissions which contribute to acidity and nutrient nitrogen. Intensive livestock units can be a significant local source of ammonia.

3.6 The control of air pollution is the responsibility of local authorities and other government agencies. Air pollution has many sources and knows no boundaries and consequently its control requires regulatory authorities to use a wide range of policy levers to influence air quality. Local authorities have a wide remit and their responsibilities touch on many aspects of our lives. To achieve their objectives they need to draw on many different resources, some statutory, and some that rely on cooperation with others. Good air quality is one such objective, where many players can affect the outcome through actions taken in different places and sometimes over long periods of time as one development succeeds another. Determining one application in isolation is not likely to achieve good air quality on its own. This is achieved through many decisions made in different circumstances guided by a mosaic of policies that implemented together will create better air quality.

[4] The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom. The Committee on the Medical Effects of Air Pollutants (COMEAP) (2010) https://www.gov.uk/government/publications/comeap-mortality-effects-of-long-term-exposure-to-particulate-air-pollution-in-the-uk

[5] Public Health England. (2013). Health Protection. Available: http://www.phoutcomes.info/public-health-outcomes-framework#gid/1000043/pat/6/ati/101/page/8/par/E12000002/are/E06000008. Last accessed 20/1/14.

[6] Comparing estimated risks for air pollution with risks for other health effects, Miller and Hurley, IOM (2006) http://www.iom-world.org/pubs/IOM_TM0601.pdf

[7] http://www.defra.gov.uk/environment/quality/air/air-quality/impacts/ 8 IARC Scientific Publication No. 161 Air Pollution and Cancer, Editors: K. Straif, A. Cohen, and J. Samet, 2013, Lyon

[9] http://www.euro.who.int/__data/assets/pdf_file/0006/238956/Health-risks-of-air-pollution-in-Europe-HRAPIE-project,-Recommendations-

4. Planning Framework

Policy context

4.1 This Chapter provides a brief overview of the important aspects of land use planning in the context of this Guidance. A more detailed review of the land use planning system in the UK is provided in Essential Environment[10], a regularly updated online and hardcopy service provided by Environmental Protection UK. Information may also be obtained from the Government's various specialist websites (e.g.www.laqm.defra.gov.uk)

Level	Relevant Documentation
National	National Planning Policy Framework Planning Practice Guidance Air Quality Strategy 2007
Regional	Regional Air Quality Strategy (for example the Mayor's Air Quality Stratergy in London)
Local	Local Development Framework (LDF), Supplementary Planning Documents (SPD), Air Quality Action Plans, Local Air Quality Guidance, Neighbourhood Plans

4.2 The 2008 Planning Act[11] introduced a change in the planning consent regime for major or 'nationally significant' infrastructure projects, for example energy, transport, water and waste. The Localism Act 2011 makes a number of amendments to the Planning Act concerning consent for infrastructure planning which is now the responsibility of the Major Infrastructure Planning Unit.

4.3 Local authorities retain the responsibility for decisions on all other developments. In arriving at a decision about a specific proposed development the local planning authority is required to achieve a balance between economic, social and environmental considerations. For this reason, appropriate consideration of issues such as air quality, noise and visual amenity is necessary. In terms of air quality, particular attention should be paid to:

- the potential for the development to give rise to breaches of the national air quality objectives and of EU Limit Values[12,13]
- whether the development will materially affect any air quality action plan or strategy, and
- the overall degradation in local air quality.

4.4 It is also important to consider whether the development will introduce new public exposure into an area of existing poor air quality.

4.5 The National Planning Policy Framework (NPPF)/Planning Policy Wales (PPW) sets out planning policy for England and Wales respectively. They place a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform an environmental role to minimise pollution. One of the NPPF twelve core planning principles notes that planning should "contribute to...reducing pollution", whilst PPW includes a core principle that requires respect for environmental limits such that resources are not irrecoverably depleted or the environment irreversibly damaged. Both NPPF and PPW recognise that to prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location. The policies state that the effects of pollution on health and the sensitivity of the area and the development should be taken into account.

4.6 The NPPF/PPW states that: "Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan".

4.7 The NPPF is supported by Planning Practice Guidance (PPG), whilst PPW is supported by Technical Advice Notes (TANs) and Supplementary Planning Guidance. These include 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 EU Limit Values" and "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". The role of the local authorities is covered by the LAQM regime, with the guidance stating that local authority Air Quality Action Plans "identify measures that will be introduced in pursuit of the objectives". The PPG makes clear that

[10] See www.pollutioncontrolonline.org.uk
[11] www.opsi.gov.uk/acts/acts2008/ukpga_20080029_en_1
[12] The duty to meet EU Limit Values is placed on the Secretary of State and not local government.
[13] The precise role of the development control process in delivering compliance with the EU limit values is uncertain, and clarification has been sought from Defra
[14] Local Air Quality Management Policy Guidance for Wales, Addendum Air Quality and Traffic Noise (2012)

"Air quality can also affect biodiversity and may therefore impact on our international obligation under the Habitats Directive", and in addition, that "Odour and dust can also be a planning concern, for example, because of the effect on local amenity". In Wales, a specific link has been made between air quality and noise such[14] that where Air Quality Action Plans prioritise measures in terms of costs and benefits, traffic noise should also be given due consideration, qualitatively if not quantitatively.

4.8 The PPG states that "Whether or not 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 generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)".

4.9 The PPG sets out the information that may be required in an air quality assessment, making clear that "Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality". It also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It states that "Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact".

4.10 An overview of the context of air quality and planning at a national, regional and local level is set out in Table 4.1. The air quality impacts of a planning application will be judged against the policies within these documents. Therefore it is important to ensure that the wording of these policies is appropriate for this purpose.

Supplementary Planning Documents and Guidance

4.11 Supplementary Planning Documents/Guidance (SPDs or SPGs) represent guidance formally adopted by local authorities in England. They provide additional information in relation to specific policy areas within the Local Development Framework. Many local authorities have now published SPGs or SPDs on air quality[15]. Often these draw on information provided in previous versions of this guidance. They generally set out when an air quality assessment is required and what it should include. Some also include criteria for assessing the significance of the impact of a proposed development. These documents are a very useful tool for providing transparent and consistent advice to both Development Control departments and developers. They can also provide a benchmark to assess the adequacy of an air quality assessment.

4.12 SPGs and SPDs can be taken into account when considering planning applications, and weight accorded to them will be increased if they have been subject to public consultation. Appropriate air quality policies should, however, underpin the more detailed guidance in the SPD or SPG to ensure its effectiveness.

The Planning Process

4.13 Development proposals may be submitted as outline or full applications. Outline applications should contain sufficient detail to allow the impacts to be properly assessed. Pre-application discussions between developers, or their representatives, and local authorities are encouraged to ensure an application is complete and meets the necessary requirements. The decisions made by local authorities should be made in accordance with the local policies and plans, unless there are material considerations to suggest otherwise.

4.14 The applicant may receive an unconditional permission or, more likely, for those developments requiring an air quality assessment, permission subject to conditions. The application can also be refused. Outline applications will be approved subject to reserved matters. In some circumstances conditions or the reserved matters require an air quality assessment prior to commencement of site works or occupation/use of a development. This is not good practice as it is unlikely that major changes will take place to mitigate any impacts at this late stage in the design of a new development.

4.15 Air quality (and other) impacts can be controlled through the application of planning conditions or through planning obligations (often known as 'section 106 agreements')[16]. Conditions are specific to the development, while planning obligations can have a wider remit. For instance, a planning condition might be used to require the installation of a suitable ventilation system, while an obligation often requires a financial contribution, for example, to require a "car club" to be set up. Conditions and planning obligations have different legal standing and advice from planners should be sought to determine the appropriate approach to apply to mitigate the air quality impacts of specific developments. Combinations of planning conditions and obligations are now often used to fund Low Emission Strategies.

[15] Examples available at www.uwe.ac.uk/aqm/review/mplanspd.htm and www.lowemissionstrategies.org/downloads/LES_Good_Practice_Guide_2010.pdf
[16] See www.communities.gov.uk/publications/planningandbuilding/circular-planningobligations

Material Considerations

4.16 The planning system recognises that, in principle, any consideration which relates to the use and development of land is capable of being a planning consideration. The circumstances of a particular planning application will determine whether or not this is the case in practice. Material considerations must be genuine planning considerations, relating specifically to the development and use of land in the public interest. They must also fairly and reasonably relate to the application concerned.

4.17 Where a planning application runs counter to relevant local policies, it is not normally permitted, unless other material planning considerations outweigh the objections and justify granting permission. This emphasises the importance of ensuring that appropriate planning policies dealing with air quality are in place. Particular attention is paid to whether such policies are met or not during the planning appeals process. If good air quality policies are in place, either within the LDF/P Core Strategy or a SPD, air quality issues will be given greater weight compared to other issues, than where there are only weak or no relevant policies.

Air quality as a material consideration

4.18 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.

Chapter 7 of this Guidance explores in more detail how to judge the significance of the air quality impacts of a development proposal, and the likely outcome in terms of planning decisions.

4.19 Some air quality assessments will be undertaken for development that falls within the scope of the Environmental Impact Assessment Regulations[17]. Such assessments will need to recognise the requirements of these Regulations, in respect of the need to define likely significant effects and identify mitigation, for example. This guidance has been written to take into account the EIA regulations, although it is not written purely for their requirements.

Linkages with other relevant issues

4.20 Decision-makers need to take account of a wide range of potential impacts arising from new developments. In many cases there are linkages between air quality and these other issues. Examples include the use of road humps to limit traffic speeds and improve safety, which can in turn increase emissions due to traffic slowing down and speeding up, and the use of biomass boilers to reduce climate change impacts, which can increase emissions of particulate matter and NOx. It is important that these linkages are fully understood and taken into account to optimise the opportunities to enhance the sustainability of new developments.

[17] The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 SI no. 1824

5. Recommended Best Practice

Introduction

5.1 This Chapter describes the roles of the local authority and developer/applicant in the process by which air quality and planning decisions are taken and then deals with how both the strategic planning and development control processes can require good practice for all new development, and how the air quality implications can be judged. The flow chart in Figure 2 below provides an overview of the process.

Overarching Concepts in Land Use Planning and Best Practice

5.2 The land-use planning and development control system has an important role to play in driving forwards improvements in local air quality, minimising exposure to pollution, and to improving the health and well-being of the population.

5.3 Whilst land-use planning and development controls rarely provide immediate solutions to improving air quality, they can ensure that future problems are prevented or minimised.

5.4 This guidance deals primarily with the development control process that is applied to determining individual applications. The role of planning at the strategic level must not be understated, however. Effective spatial planning can reduce the need to travel by car to the workplace, schools, shopping and leisure facilities by ensuring new dwellings are located in areas where such facilities are readily available, or where good public transport links are provided. Careful consideration to building design and layout can assist in minimising exposure to future occupants. Policies that enforce high building standards can play an important role in reducing emissions from services that provide heating and hot water – an increasingly important sector as measures to tackle transport emissions are tightened.

Land-use Planning

5.5 The land-use planning system has significant potential to influence local air quality positively through the careful design of neighbourhoods. Some actions which are strongly encouraged include:

- The inputs of planning, transport, housing, education and environment departments should be fully integrated to ensure that environmental considerations, including those related to air quality, are considered at the earliest stages of the strategic planning processes;
- Services should be joined up and easier to access via public transport or other sustainable choices such as cycling and walking; and
- Careful consideration should be given to the location of developments (e.g. within the development of Site Allocation Policies) where particularly sensitive members of the population are likely to be present e.g. school buildings should generally be sited 100m or more away from busy roads.

Examples of Best Practice

5.6 A particular concern of many local authorities is that individual developments are often shown to have a very small air quality impact, and, as a consequence, there are few mechanisms available to the planning officer to require the developer to achieve lower emissions. This, in turn, leads to concerns about the potential air quality impacts of cumulative developments as many individual schemes, deemed insignificant in themselves, contribute to a "creeping baseline".

5.7 To tackle this issue, a number of authorities have developed various approaches to identify the requirement for best practice and mitigation at an early stage of the assessment process. A summary of a number of these approaches is set out in Box 1; in the majority of cases, these approaches only consider emissions from road traffic generated by the scheme. The basic concept is that best practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions.

5.8 It is probably not practicable or appropriate to apply the approaches described in Box 1 to very small developments which will have only a very small impact on local air quality conditions. An approach that is commonly used is to consider only "major" developments, such as defined within the Town and Country Planning (Development Management Procedure) Order (England) 2010 [(Wales) 2012]. These include developments where:

- The number of dwellings is 10 or above;
- The residential development is carried out on a site of more than 0.5ha where the number of dwellings is unknown;
- The provision of more than 1000 m^2 commercial floorspace; or
- Development carried out on land of 1ha or more.

5.9 Developments which introduce new exposure into an area of existing poor air quality (e.g. an AQMA), however, should not be excluded at this stage.

Best-Practice Measures

5.10 A series of best-practice measures are recommended, which should be applied to all developments that have not

Figure 2: Role of Local Authority and Applicant/Developer in the Planning Process

Local Planning Authority (LPA)		Applicant / Developer
Strategic Planning Air Quality Policy(ies) in Core Document. Supplementary Planning Document (SPD), good practice guidance, and / or Air Quality Action Plan (AQAP) sets out local assessment requirements, best practice / minimum standards and financial contributions	←	Developer may make representations during public consultation
Pre-application Discussions	↔	Consult on assessments required
Development Control Determines whether an AQA is required. Informs applicant /developer of air quality policies in plan/SPD/ AQAP or other document, and requirements for best practice for all developments	↔	Consults on whether an air quality assessment (AQA) is required
Air Quality Officer comments	↔	Consults on the AQA methodology
Air Quality Officer provides planning department with comments on application including their recommendations	↔	Prepares AQA and issues to LPA, may provide clarification or further information in response to comments
Statutory bodes consulted, and comments submitted to planning officer	↔	May provide clarification or further information in response to comments
Planning conditions drafted e.g. on mitigation measures	↔	Input to draft planning conditions
S106** or CIL*** agreement e.g. contribution to mitigation or Low Emission Strategy	↔	Input to S106/CIL
Planning Officer prepares report with recommendations for the Development Control (DC) Committee*		
DC Committee makes decision*. May refer matter back to Planning Department for more information; may require additional conditions	←	Applicant makes short representation in person
Agree pre-development planning conditions have been complied with. Possibly request further information	↔	Developer submission(s) to show pre-development conditions complied with.
Enforcement of planning requirements		

* Major applications are usually determined by the Development Control Committee; but in some cases the decision may be delegated to Planning Officers.
** Section 106 of the Town and Country Planning Act 1990 (as amended)
*** Community infrastructure levy

Box 1.: Examples of Approaches to Best Practice and Mitigation.

1. Air Quality and emissions mitigation guidance for Sussex authorities

The Sussex Air Quality Partnership has prepared guidance to assess the potential impacts of new development, providing a consistent approach to mitigation. The guidance follows a three stage process. The first stage is used to screen out developments that will have very small impacts, on the basis of their size or location. All developments that are not screened out are required to carry out an "emissions mitigation assessment". This quantifies the additional emissions generated by traffic for the development (following a set of defined assumptions) and then assigns a monetary value to this (over a 5 year period, based on Defra's damage cost approach). This defines the value of mitigation that should be applied, preferably on-site.

For some developments, e.g. those within an AQMA, developments that exceed threshold criteria for parking or traffic generation, or where new exposure is introduced, an air quality assessment is also required, to determine the likely significant effects.

2. West Yorkshire Air Quality and Emissions Planning Guidance

The West Yorkshire Low Emissions Strategy Group has published guidance for integrating air quality considerations into land-use planning and development management policies. The air quality assessment process follows three stages:

Determining the classification of the development proposal – schemes are classified as Minor, Medium or Major based on criteria that would trigger the need for a Transport Assessment (Medium) and those that meet additional criteria such as lying within an AQMA, exceeding thresholds for traffic generation etc. (Major).

Air quality impact assessment – Minor and Medium development proposals are further screened to identify if they will introduce new exposure, which subsequently influences the degree of mitigation required. Major development proposals are required to complete both a detailed air quality assessment (to determine likely significant effects) and a quantification of pollutant emission costs (for traffic generation only) based on a set of defined assumptions and using Defra's damage cost approach.

Mitigation and compensation- the outcome of stage

2 is used to determine the level of appropriate mitigation. Default mitigation measures are proposed for Minor, Medium and Major development; for the latter the scale of mitigation is related to the calculated pollution damage costs.

3. Greater London Authority – Air Quality Neutral Policy

The Mayor's SPG on Sustainable Design and Construction requires ultra-low NOx boilers in all new developments and sets emissions standards for all new CHP and biomass plant.

The SPG also sets out guidance on the implementation of "air quality neutral" in London. This is achieved by establishing benchmarks for both building and transport emissions which all new developments must comply with. Where compliance cannot be achieved, developers are required to prepare strategies to demonstrate how the excess will be mitigated, on or off-site.

been screened out. These cover both buildings and transport emissions, and address both the design and operational phases. Examples include:

Design phase

- 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, whilst minimising energy demand;

Operational Phase

- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000m^2

of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made;
- 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 mgNOx/kWh
- All gas-fired CHP to meet a minimum emissions standard of:
  - Spark ignition engine: 150 mgNOx/Nm^3
  - Compression ignition engine: 400 mgNOx/Nm3
  - Gas turbine: 50 mgNOx/Nm^3
- Consideration should be given to adopting the emission standards for heat and power plant, as set out in the Mayor of London's SPG.
- A presumption should be to use gas-fired installations. Where biomass is proposed (normally outside of urban areas) it is to meet minimum emissions standards of
  - Solid biomass boiler: 180 mgNOx/Nm^3 and 15 mgPM/Nm^3

Offsetting Emissions

5.11 In addition to these best-practice measures, local authorities may wish to incorporate additional measures to offset emissions at an early stage. 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 best-practice measures to control boiler and CHP emissions are enforced (as described above) then this is not essential.

5.12 An approach that has been widely used to quantify the costs associated with pollutant emissions from transport is:
- Identify the additional trip rates (as trips/annum) generated by the proposed development (this information will normally be provided in the Transport Assessment;
- Assume an average distance travelled of 10km/trip
- Calculate the additional emissions of NOx and PM_{10} (kg/annum), based on emissions factors in the Emissions Factor Toolkit, and an assumption of an average speed of 50 kph;
- Multiply the calculated emissions by 5, to assume emissions over a 5 year time frame;
- Use the HM Treasury and Defra IGCB damage cost approach[18] to provide a valuation of the excess emissions, using the currently applicable values for each pollutant[19];
- Sum the NOx and PM_{10} costs.

5.13 The cost calculated by these means provides a possible basis for defining the financial commitment required for the offsetting emission reductions or the contribution provided by the developers as 'planning gain'.

5.14 Typical measures that may be considered to offset emissions, include:
- 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.

[18] Dickens R, Gill J, Rubin and Butterwick M (2013) Valuing impacts on air quality: Supplementary Green Book guidance. HM Treasury and Defra.
[19] https://www.gov.uk/air-quality-economic-analysis#damage-costs-approach

6. Undertaking an Air Quality Assessment

Purpose

6.1 The air quality assessment is undertaken to inform the decision making with regard to the development. It does not, of itself, provide a reason for granting or refusing planning permission. Almost all development will be associated with additional emissions if the development is considered in isolation. In most cases, therefore, development will be associated with adverse impacts. These impacts require quantification and evaluation in the context of air quality objectives (or limit values) and existing air quality. The significance of the effects arising from the impacts on air quality will depend on a number of factors and will need to be considered alongside the benefits of the development in question. Development under current planning policy is required to be sustainable and the definition of this includes social and economic dimensions, as well as environmental. Development brings opportunities for reducing emissions at a wider level through the use of more efficient technologies and better designed buildings, which could well displace emissions elsewhere, even if they increase at the development site. Conversely, development can also have adverse consequences for air quality at a wider level through its effects on trip generation.

6.2 Where a development requires an air quality assessment, this should be undertaken using an approach that is robust and appropriate to the scale of the likely impacts. One key principle is that the assessment should be transparent and thus, where reasonable, all input data used, assumptions made, and the methods applied should be detailed in the report (or appendices).

The need for an air quality assessment

6.3 It is established good practice to consult with the Local Planning Authority (and/or its air quality specialists) to gain agreement on the approach and methodology that will be used for an air quality assessment in support of a planning application. There is however a prior step in the consultation process, which is to determine the very need for an assessment. If an assessment is required, the approach and methodology can then be constructed to deal with the key issues driving the need for the assessment.

6.4 To inform the consultation process, it will be important to identify the locations of any AQMAs relative to the proposed development, the main existing and proposed sources of atmospheric pollution, the location of existing and proposed human-health sensitive receptors and the location and proximity of any sites designated for their ecological importance.

6.5 It is reasonable to expect that an assessment will be required where there is the risk of a significant air quality effect. To a large extent, professional judgement will be required to determine whether an air quality assessment is necessary as it is not possible to apply an exact and precise set of threshold criteria to cover the wide variety of development proposals. The following tables provide criteria that may be useful to guide the consultation process in establishing the need for an assessment. They separately consider:

- the impacts of existing sources in the local area on the development; and
- the impacts of the development on the local area.

6.6 Where an air quality assessment is identified as being required, this may be either a Simple or a Detailed assessment. There is a general presumption that all regulated processes will require an air quality assessment.

6.7 The criteria provided are precautionary and should be treated as indicative; in some instances it may be appropriate to amend them on the basis of professional judgement.

6.8 As set out in Chapter 1: Introduction, this guidance document is not intended to address the air quality impacts associated with sources of dust (e.g. mineral extraction, waste handling) or odours. Clearly, where such developments are proposed then it may be necessary to undertake an appropriate air quality assessment; similarly, where new developments are located in the vicinity of such sources, then the potential impacts of their operation on the proposed development will need to be considered.

6.9 In the case of existing industrial operations (including combustion and other industrial processes) it is not feasible to establish generic screening criteria, and the requirement to take account of such sources will need to be dealt with on a scheme-by-scheme basis.

Impacts of the Local Area on the Development

6.10 There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the 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 or EU limit values;
- The presence and location of Air Quality Management Areas;
- The presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations

of pollutants (and NO_2 , in particular), that would cause unacceptably high exposure for users of the new development.

Impacts of the Development on the Local Area

6.11 In this case, a two-stage approach is suggested, the first stage only requiring limited information. The **first stage** is intended to screen out smaller development and/or developments where impacts can be considered to have insignificant effects[20]. The **second stage** relates to specific details regarding the proposed development and the likelihood of air quality impacts.

6.12 Stage 1 requires any of the criteria under (A) coupled with any of the criteria under (B) to apply before it is considered appropriate to proceed to Stage 2. If none of the criteria are met, then there should be no requirement to carry out an air quality assessment for the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects.

Stage 1

Criteria to Proceed to Stage 2

A. If any of the following apply:

- 10 or more residential units
- more than 1,000 m^2 of floor space
- a development is to be carried out on a site with an area of 1 hectare or more

B. Coupled with any of the following:

- the development has more than 10 parking spaces
- the development will have a centralised energy facility or other combustion process
- the development has the potential to have an impact upon an AQMA
- the development will affect traffic on roads passing within 100 m of an internationally or nationally designated habitat

Stage 2

6.13 The following criteria provide more specific guidance as to when an air quality assessment is likely to be required to assess the impacts of the proposed development on the local area. Their derivation takes account of the more stringent nature of the impact descriptors when concentrations are near to or above the objectives, and when even very small changes may lead to slight adverse impacts.

6.14 Where an air quality assessment is identified as being appropriate, then this may take the form of either a Simple Assessment or a Detailed Assessment.

6.15 If none of the criteria are met, then there should be no requirement to carry out an air quality assessment for the impact of the development on the local area, and the impacts can be considered to be insignificant.

[20] Taking account of criteria published in: a) The Town and Country Planning (Development Management Procedure) (England) Order 2010 – 2010 No. 2184 [(Wales) Order 2012, No 801(W11)] (HMSO), b) The GLA's Supplementary Planning Guidance (SPG) on Sustainable Design and Construction (2014) and c) The Sussex Air Quality Partnership's Air Quality and Emissions Mitigation Guidance for Sussex Authorities (2013) v January 2014

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment [a]
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors.	A change of LDV flows of: - more than 100 vehicles per day (vpd) within or adjacent to an AQMA or within 100 m of an internationally or nationally designated habitat - more than 500 vpd elsewhere Coupled with relevant receptors within: - 10 m of roads with AADT flows 5,000 to 10,000 - 20 m [a] of roads with AADT flows 10,000 to 30,000 - 30 m [a] of roads with AADT flows >30,000
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A change of HDV flows of - more than 25 vpd within or adjacent to an AQMA or within 100 m of an internationally or nationally designated habitat - more than 100 vpd elsewhere Coupled with relevant receptors within: - 10 m [a] of roads with AADT flows 5,000 to 10,000 vpd - 20 m [a] of roads with AADT flows 10,000 to 30,000 vpd - 30 m [a] of roads with AADT flows >30,000 vpd
3. Cause a significant change in road alignment bringing roads closer to relevant receptors.	Where relevant receptors will be within: - 10 m [a] of roads with AADT flows 5,000 to 10,000 vpd - 20 m [a] of roads with AADT flows 10,000 to 30,000 vpd - 30 m [a] of roads with AADT flows >30,000 vpd
4. Introduce a new junction near to relevant receptors.	The junction will cause vehicles to slow down and accelerate, e.g. traffic lights Coupled with relevant receptors within 50 m of the junction
5. Introduce or change a bus station.	Where bus flows will be: - more than 25 vpd within or adjacent to an AQMA - more than 100 vpd elsewhere Coupled with relevant receptors within: - 50 m [a] of the buses within the bus station
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor Coupled with the car park having more than 100 movements per day (total in and out)
7. Have one or more substantial combustion processes	Where the combustion unit is: - any centralised plant using biomass fuel - CHP unit >15kWe - any other combustion plant with thermal input >400kW$_{th}$ - a standby emergency generator associated with a centralised energy centre

[a] Where distances from the road are presented, they are from the edge of the nearest carriageway to the nearest relevant receptor, taking account of vertical and horizontal dimensions. Where traffic flows are presented they are Annual Average Daily Traffic (AADT) in vehicles per day (vpd). Where HDV flows are specified, they include lorries and buses. Where LDVs are specified they include cars and vans (with gross vehicle weight equal or less than 3.5 tonnes).

Content of an air quality assessment

6.16 The intent of an air quality assessment is to demonstrate the likely changes in air quality or exposure to air pollution, as a result of a proposed development. Where possible, these changes will be quantified, although in some instances a qualitative assessment will be sufficient. Ultimately, the planning authority has to use this information to form its own view on the "significance" of the effects of air quality impacts, and thereby the priority given to air quality concerns in determining the application. The assessment therefore needs to provide sufficient information to allow this decision to be made.

6.17 In some circumstances, there will be an existing permission for development on the site that has not yet been exercised. In the planning system, the estimated emissions from the existing permission could be considered as part of the future baseline and thus a revised application for the site would give rise to an incremental change emission from that associated with the extant permission. This guidance recommends that impacts be assessed for the new permission sought against the current baseline for the site, disregarding the extant permission; this will reflect the 'real world' increase experienced by receptors.

6.18 It is important that an agreement is reached between the applicant and the local authority as to the proposed assessment methodology. The basis of the assessment should be to compare the air quality following completion of the development with that expected at that time without the development. Comparison with existing conditions will also be required, as current conditions are those with which people are familiar. There are three basic steps in an assessment:

i. Assess the existing air quality in the study area (existing baseline);
ii. Predict the future air quality without the development in place (future baseline);
iii. Predict the future air quality with the development in place (with development).

6.19 The report prepared detailing the results of the assessment should contain the following information:

a) *Relevant details of the proposed development*. A description containing information relevant to the air quality assessment should be provided, although a fully detailed description of the proposal is not required. This should identify any on-site sources of pollution and an overview of the expected traffic changes or the changes in emissions from the site for a specified year, e.g. the opening year or year the project is completed if phased. A brief introduction to the sensitivity of the area should also be provided, noting the presence of an AQMA or any Natura 2000 site and any other nearby sources that may affect the site. The proposed location of any sensitive receptors in relation to these nearby sources should be described. An introduction to the pollutants and sources to be assessed should be provided and, if appropriate, those that have been scoped out of further assessment.

b) *The policy context for the assessment*. This should summarise the national and local policies that should be taken into account in the assessment. In London this will also include the Mayor's policies. This is especially important where there are local policies designed to improve air quality.

c) *Description of the relevant air quality standards and objectives*. Most air quality assessments will be carried out to assess compliance with UK air quality objectives and EU limit values.

d) *The basis for determining significance of effects arising from the impacts*. The descriptors used for impacts should be set out, together with the basis for determining the significance of the effects arising from air quality impacts.

e) *Details of the assessment methods*. This section should provide details of the methods, including the model (and version number) and the input data used for the assessment and any assumptions that have been made. Where a commonly applied method is used, a detailed description of the model itself is not required. Details should be provided on all local input data and assumptions, including:

- the emission data and their source, with details where non-standard data are used;
- source of the meteorological data, with a description of how representative they are of the conditions in the vicinity of the proposed development;
- baseline pollutant concentrations;
- background pollutant concentrations;
- choice of baseline year;
- basis for NOx:NO_2 calculations.

There will be some variation between requirements for reporting data relating to point sources and road traffic. The former will have some physical properties of the emission to be reported, i.e. stack height, diameter, emission velocity and exit temperature. The latter will require details of assumptions made regarding emission factors and features of the traffic flows used in the model, such as speeds and vehicles types, e.g. percentage of heavy duty vehicles (HDVs) in the traffic.

f) *Model verification*. This will be required for all traffic modelling, but is not appropriate for point-source modelling. Model verification involves a comparison of the predicted versus measured concentrations, and allows an adjustment to be made to account for systematic errors. Such errors may include uncertainties in traffic flow, vehicle emission factors and estimated background concentrations, as well as limitations of the model to represent dispersion in settings where air flow is affected by roadside buildings, trees etc.. Model verification will be important, especially where predicted concentrations are close to the objective, and should be based on the most appropriate available data (for some schemes it may be necessary to carry out specific monitoring to allow robust model verification to be undertaken). A more complete description of the approach to model verification is provided in LAQM.TG(09) [21]. Full details of the verification should be provided in the assessment.

g) *Identification of sensitive locations*. Local receptors should be identified, including residential and other properties close to and within the proposed development, as well as alongside roads significantly affected by the development, even if well away from the development site, and especially if within AQMAs. These receptors will represent locations where people are likely to be exposed for the appropriate averaging time (dependent on the air quality objective being assessed against). Ecologically sensitive areas should also be identified where there is sufficient reason to believe that they may be affected.

h) *Description of baseline conditions*. The findings of any site visit(s) and/or desktop investigations will be set out, noting sources that may affect local air quality. A description of available monitoring data will be important to help define baseline conditions and put the model results into context. Where monitoring data are included in the report, it will be important to include details of the monitoring locations, the monitoring method, sampling period, data capture and any adjustments applied to the data, such as diffusion tube bias adjustment factors. Reference should also be made to the background maps produced by Defra, together with any adjustments of these mapped values to take account of local monitoring (but only where the monitoring is at true background sites). Reference should also be made to the Defra maps showing sections of road where the limit value is exceeded, as these represent the 'official' exceedences of the limit value, as reported to the European Commission.

i) *Assessment of impacts*. Results of modelling the 'with development' scenario should be clearly set out in tables, and where appropriate as concentration contours on maps of the study area. Comparisons should be made with the 'no development' conditions. Differences in concentrations between 'with development' and 'no development' conditions should also be tabulated. Descriptions of the impacts at the individual receptors should be provided (see section below), taking into account the absolute concentrations in relation to the air quality objectives.

j) *Description of construction phase impacts*. These impacts will relate primarily to dust emissions, which give rise to dust soiling and elevated PM^{10} concentrations, although construction plant and vehicles may need assessment. The assessment should take into consideration the likely activities, duration and mitigation measures to be implemented. The distance over which impacts are likely to occur and an estimate of the number of properties likely to be affected should be included. This assessment should follow the guidance set out by the IAQM[22]

k) *Cumulative impacts and effects*. In many cases, the impact of the development being assessed will have a cumulative effect with other planned developments, which may or may not have planning permission. Where these developments have been granted planning consent and are therefore 'committed' developments, their impacts should be assessed cumulatively with those of the application site. This can arise when several developments are contributing additional road traffic on one stretch of road.

l) *Mitigation measures*. In those cases where a significant effect is identified then the measures to be employed to avoid, reduce and, if possible, offset this effect should be set out. Even where the effect is judged to be insignificant, consideration should be given to the application of good design and best practice measures, as outlined in Chapter 5. This is especially the case for developments that increase emissions of particulate matter, as all reductions in emissions will be beneficial for human health.

m) *Summary of the assessment results*. This should include:

- Impacts during the construction phase of the development (usually on dust soiling and PM_{10} concentrations);
- Impacts during operation (usually on concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$);
- Any exceedences of the air quality objectives or EU air quality limit values arising as a result of the development, or any

[21] See www.defra.gov.uk/environment/airquality/local/guidance/pdf/tech-guidance-laqm-tg-09.pdf
[22] http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf

worsening of a current breach (including the geographical extent);
- Whether the development will compromise or render inoperative the measures within an Air Quality Action Plan, where the development affects an AQMA;
- The significance of the effect of any impacts identified; and
- Any apparent conflicts with planning policy.

6.20 In some cases the likely changes in the population exposed to concentrations above the objective over time should also be included in the assessment, particularly where new receptors are being introduced into an area of high pollution.

6.21 Most assessments are carried out for the first year of the proposed development's use, as this will generally represent the worst-case scenario. This is because background concentrations are predicted to decline in future years, as emissions from new vehicles are reduced by the progressive introduction of higher emissions standards. Where development is phased, however, it may also be appropriate to assess conditions for the opening years of each new phase.

Agreement of datasets and methodologies

6.22 Before undertaking an assessment, every effort should be made to obtain agreement between the planning authority and the assessor on the appropriate datasets and methodologies to be used, as described above.

6.23 It is important to recognise that the focus of the procedures used by local authorities to prepare their Review and Assessment reports is designed specifically for the purpose of identifying whether any air quality objectives are likely to be exceeded. An air quality assessment for a development will need to go beyond this, with attention given to defining the magnitude of the changes that will take place, even where objectives are not exceeded. Nevertheless, the technical guidance to help local authorities carry out their LAQM duties includes some useful information on carrying out an air quality assessment, especially the Appendices to LAQM.TG(09).

6.24 In some cases, it may be appropriate to carry out a period of air quality monitoring as part of an air quality assessment. This may be particularly helpful where new relevant exposure is proposed in a location with a complex road layout and/or topography, which may be difficult to model, or where there are no data available to verify the model. Monitoring should ideally be carried out for a minimum of six months using a methodology and locations agreed with the local authority. Where monitoring is carried out for less than a year, the results will need to be adjusted to an annual mean equivalent using the methodology described in the Technical Guidance, LAQM.TG(09). This will add to the uncertainty associated with any model verification and adjustment, and this should be recognised.

Describing the impacts

6.25 It is useful for all parties involved in the planning process to use a consistent approach for the description of the impacts. The EIA process requires the magnitude of changes to be set out and taken into account. In many instances there is also a desire to use a consistent descriptive terminology across all environmental impacts within an environmental statement so that, for example, ecological and noise impacts can be described using the same terminology as applied to air quality. The assessment may use its own set of criteria to define magnitude, but the important matter to be concluded is the likely significant effects of the impacts on air quality. There is, therefore, a two stage process to be followed in the assessment:

- 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 effect of any impacts.

6.26 The impacts are usually assessed at selected 'receptors'. It can also be helpful to present the changes in concentrations across the study area as a whole, using concentration isopleths on a map of the area, as this will help to inform the decision as to whether the effect is significant or not (by describing the geographical extent over which impacts occur and by helping identify the sensitive receptors that might be affected).

6.27 The framework for the assessment of impacts should be capable of application to all types and scales of development. It cannot simply reflect a response to small scale developments, or conversely, to the largest, and should be able to consider point and diffuse sources as well as traffic impacts, and a wide range of pollutants.

6.28 As a starting point, the changes in concentrations should be evaluated as the long-term averages (annual means). In certain circumstances, notably for point sources or where the short-term peak concentrations are already high, it will also be appropriate to consider short-term peak concentrations. The implications of these changes in concentration for the degree of impact are discussed later in this Chapter.

6.29 A practical way of assigning a meaningful description to the degree of an impact is to express the magnitude of incremental change as a proportion of a relevant assessment level and then to examine this change in the context of the new total concentration and its relationship with the assessment criterion. In this document, the term Air Quality Assessment Level or AQAL has been adopted, as it covers all pollutants, i.e. those with and without formal standards. In many cases, the AQAL will be the air quality objective value or the EU limit value. (Note that impacts may be adverse or beneficial, depending on whether the change in concentration is positive or negative.)

6.30 One advantage of this approach is that it avoids the need for individual pollutants to have their own tailored method of assessment. Since air quality standards are set on the basis of harm, it is reasonable to assume that the degree of harm is represented by the margin by which the AQAL is exceeded. This concept is not universally true and many pollutants exert an effect on human health or ecosystems at exposures that are below the standard[23]. It does, however, provide a sound and consistent basis for a framework for the assessment of impacts.

Where legislative standards do not exist for a particular pollutant, it is common practice to adopt the Environmental Assessment Level from the Environment Agency's list in its H1 guidance note[24], which can be used as the AQAL.

6.31 The suggested framework for describing the impacts on the basis set out above is set out below in Table 6.1. The term AQAL is used to include air quality objectives or limit values, where these exist.

[23] This is in part reflected in the description of impacts as being 'slight' or 'moderate', even when concentrations are well below the AQAL (see Table 6.1)
[24] In Wales, the functions of Environment Agency Wales have been taken over by Natural Resources Wales which has adopted much of the existing guidance but is currently reviewing it where necessary.

Table 6.1: Impact description for individual receptors.

Concentration with development	% Change in air quality relative to Air Quality Assessment Level (AQAL)			
	<1	1-5	5-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Explanation

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
2. Descriptors for individual receptors only; the overall significance is determined using professional judgement (see Chapter 7). For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact is significant. Other factors need to be considered.
3. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.
4. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

6.32 It is recommended that $PM^{2.5}$ is used to assess the impact of combustion sources (including road traffic) rather than PM^{10}, as the AQAL[25] is much lower on the basis of the air quality objective and EU limit values. Most particulate matter from combustion processes occurs in the smaller size fraction. If, however, PM^{10} is assessed, then Table 6.1 should be applied assuming that in England and Wales 35 days greater than 50 μg/m³ is equivalent to an annual mean of 31.5 μg/m³,

6.33 The number of significant figures to which concentrations should be reported should reflect the accuracy associated with predicted changes and the knowledge of background concentrations. This is ultimately a compromise between reducing the number in recognition of the uncertainty associated with air quality calculations and the need to contribute to the decision making process by being able to demonstrate a small but widespread change, if one exists. Three significant figures may be appropriate, e.g. 0.403, 4.03, or 40.3 etc.. There may be occasions, however, when it is better to present results to two significant figures, depending on professional judgement regarding the accuracy of the data[26]. Any rounding of the data should only be applied after any calculations have been completed.

6.34 For most road transport related emissions, and diffuse emissions associated with development, long term average concentrations are the most useful for evaluating the severity of impacts. For any point source, some consideration must also be given to the impacts resulting from short term, peak concentrations of those pollutants that can affect health through inhalation, e.g. sulphur dioxide. The Environment Agency uses a threshold criterion of 10% of the AQAL as a screening criterion. This is a reasonable value to take and this guidance also adopts this as a basis for defining an impact that is imperceptible in magnitude. Background concentrations are less important in determining the severity of impact for short term concentrations, not least because the peak concentrations attributable to the source and the background are not additive.

6.35 Short term concentrations in this context are those averaged over periods of an hour or less. These are exposures that would be regarded as acute and will occur as a plume from an elevated source affects airborne concentrations experienced by a receptor.

6.36 Where such peak concentrations are in the range 10-20% of the AQAL, then they can be described as small, those in the range 20-50% medium and those above 50% as large. These are the maximum concentrations experienced in any year. In most cases, the assessment of impact severity will be governed by the long-term exposure experienced by receptors and it will not be a necessity to define the significance of effects by reference to short-term impacts. The severity of the impact will be high when there is a risk that the relevant AQAL for short-term concentrations is approached through the presence of the new source, taking into account the contribution of other local sources.

6.37 Impacts on sites of designated nature conservation interest need to be expressed in a manner that is consistent with the methods and guidance used by nature conservation agencies. This means that airborne concentrations of the key pollutants (typically NO_x and NH_3) should be expressed as a fraction of the 'critical level' and deposition rates of acidity and nutrient nitrogen as a fraction of the 'critical load'. These concepts and appropriate values can be found on the Air Pollution Information System (APIS)[27]. The task of defining the magnitude of the impacts in this context is part of the air quality assessment, but in those cases where the impact cannot be described as having an insignificant effect, then an ecologist will be required to provide a commentary and judgement on this aspect.

[25] An annual mean of 20 μg/m³ for $PM_{2.5}$, by 1 January 2020, compared with 40 μg/m³ for PM_{10}

[26] This is not the case where the changes being reported are small, as it could lead to the presentation of misleading data. For example a change of 0.2 μg/m³ for the annual mean nitrogen dioxide concentration from 40.2 to 40.4 μg/m³ would be presented as 40 μg/m³ without and 40 μg/m³ with the scheme, while the same change applied to 40.4 μg/m³ without to 40.6 μg/m³ with the scheme, would be presented as 40 μg/m³ without and 41 μg/m³ with the scheme.

7. Assessing Significance

7.1 Impacts on air quality, whether adverse or beneficial, will have an effect on human health or the integrity of sensitive habitats that can be judged as 'significant' or 'not significant'. This is the primary requirement of the EIA regulations, but is also relevant to other air quality assessments. It is important to distinguish between the meaning of 'impact' and 'effect' in this context. An impact is the change in the concentration or deposition rate of an air pollutant, as experienced by a receptor. This may have an effect on the health of a human receptor or the integrity of a habitat, depending on the severity of the impact and other factors that may need to be taken into account. Judging the severity of an impact is generally easier than judging the significance of an effect.

7.2 The significance of effect that any proposed development might have will also be judged at two separate stages of the development control process, as follows:

- the first is within the air quality report accompanying the planning application; while
- the second is when the local authority's air quality specialist makes his/her recommendations to the planning officer.

7.3 These are mutually exclusive requirements serving different purposes. Ultimately, any disputes on these matters are dealt with by the judgement of the planning committee and/or a planning inspector following a planning appeal. A significant air quality effect is not, of itself, a reason for refusal of a planning application; that decision will be the outcome of a careful consideration of a number of factors by a planning committee (or a planning inspector/Secretary of State), air quality being just one of the factors.

7.4 The assessment framework for describing impacts can be used as a starting point to make a judgement on significance, but there will be other influences that might need to be accounted for. The impact descriptors set out in Table 6.1 are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not be judged as being significant.

7.5 One of the relevant factors in the judgement of the overall significance may relate to 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 or ecosystems.

7.6 Often, it is possible to be very clear when an impact is sufficiently small that it has a negligible effect on receptors and can therefore be described unequivocally as 'not significant'[28]. In the opposite case, when an impact is very large, it will be obvious that there is potential for a significant effect. The problem lies in the intermediate region where there is likely to be uncertainty on the transition from insignificant to significant. In those circumstances where a single development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not have a significant effect, but such judgements are always more likely to be valid at the two extremes of impact severity.

7.7 Any judgement on significance will need to take into account such factors as:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the worst case assumptions adopted when undertaking the prediction of impacts; and
- the extent to which the proposed development has adopted best practice to eliminate and minimise emissions.

7.8 The judgement on significance relates to the consequences of the impacts; will they have an effect on human health or the integrity of habitats that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in changes in health outcomes or the integrity of habitat features that could be regarded as significant by health care professionals or nature conservation agencies.

7.9 There are criteria for habitats that make the judgement of significance a more straightforward one than for health. Current practice is to take 1% of a critical level or critical load as the starting point for a test of insignificance. Should this threshold be exceeded for an impact, then the judgement on significance of effect requires an assessment to take into account the background concentration, other factors which may affect the integrity of the habitat feature and the extent of the area within the habitat that might be affected. This is a judgement that should be made by an ecologist.

[28] The precise role of the development control process in delivering compliance with the EU limit values is uncertain, and clarification has been sought from Defra. In the event that unambiguous clarification from Government is provided, which confirms that any increase in concentration should not be permitted where an EU limit value is not met, then even a "slight adverse" impact may need to be regarded as significant if levels exceed the EU limit value.

7.10 In contrast, there are no equivalent means of assigning significance to health outcomes as yet, even though quantification of mortality and morbidity effects from certain air pollutants at the population level has evolved to a point where reasonable confidence in the estimates exist. Part of any judgement on the significance of health effects would incorporate the size or the population exposed to changes in concentrations.

7.11 For local authorities, there may also be a question of meeting air quality objectives as part of their obligations under Local Air Quality Management Regulations. As has already been noted, the presence of an AQMA that may be affected by a proposed development will increase the sensitivity of the application and any accompanying assessment. The impacts descriptor table acknowledges this and points to a conclusion of significant effect in cases where concentrations of a regulated pollutant are in excess of the objective value. Where the baseline concentrations are close to the objective value at a receptor, but not exceeding it, a case may be made for the development's predicted contribution being significant. It will always be difficult, however, to attribute the exceedence of an objective to any individual source.

8. Mitigating Impacts

8.1 Developers should be encouraged to submit proposals that are consistent with the principles outlined in Chapter 5. This will assist in reducing emissions and therefore in reducing impacts. In those circumstances where the assessment concludes that there will be a significant effect, then there is a requirement for mitigation, where this is feasible. Where the development proposal has already adopted the best practice for its type, there may be a need to implement further measures of the kind already incorporated or provide for some form of compensating pollution control measures in the local area. Where practicable, the impact of the mitigation measures should be quantified.

8.2 The type of measures proposed to improve air quality will depend on the nature and scale of the proposed development. Where the proposal is for a small number of new residential units in an area of high pollutant concentrations, it would be reasonable to examine design and ventilation arrangements to reduce the impact of the external environment on occupants in the building. Where the proposed development is larger and its impact on air quality greater, then more measures should be considered, such as improvements in the emissions from public transport and funding for traffic management measures over a wider area. Large industrial developments subject to control under the Environmental Permitting Regulations should conform with best practice within the relevant sector and in consultation with the regulator. Increasing stack height may be one option for reducing impacts at specific receptors and will be an outcome of permitting.

8.3 The presence of an AQMA should not halt all development, but where development is permitted, the planning system should ensure that any impacts are minimised as far as is practicable. Even where developments are proposed outside of AQMAs, and where pollutant concentrations are predicted to be below the objectives/limit values, it remains important that the proposed development incorporates good design principles and best practice measures, as outlined in Chapter 5, and that emissions are fully minimised.

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Abbreviations and acronyms

AADT – Annual Average Daily Traffic

AQA – Air Quality Assessment

AQAL – Air Quality Assessment Level

AQAP – Air Quality Action Plan

AQMA – Air Quality Management Area

AQO – Air Quality Objective

CHP – Combined Heat and Power (Plant)

Defra – Department for Environment, Food and Rural Affairs

EA – Environment Agency

EIA – Environmental Impact Assessment

EPR – Environmental Permitting (England and Wales) Regulations 2010

EPUK – Environmental Protection UK

EU – European Union

EV – Electric Vehicle

HDV – Heavy Duty Vehicle

HRAPIE – Health risks of air pollution in Europe – A World Health Organisation project

IAQM – Institute of Air Quality Management

LA – Local Authority

LAQM – Local Air Quality Management

LAQM – TG(09): Local Air Quality Management: Technical Guidance (09)

LDF – Local Development Frameworks

LDP – Local Development Plans

LDV – Light Duty Vehicle

LPA – Local Planning Authority

NO_2 – Nitrogen Dioxide

NO_x – Oxides of Nitrogen

NPPF – National Planning Policy Framework

NRW – Natural Resources Wales

PM_{10} and $PM_{2.5}$ – Particulate matter with an aerodynamic diameter of less than 10 microns (µm) (PM10) or less than 2.5 µm (PM2.5), expressed in units of µg/m3**.**

PPG – Planning Practice Guidance

PPW – Planning Policy Wales

PHE – Public Health England

SPD – Supplementary Planning Document.

SPG – Supplementary Planning Guidance.

SO_2 – Sulphur Dioxide

TAN – Technical Advice Note

VPD – Vehicles Per Day

WG – Welsh Government

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