

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

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

Final draft April 2015



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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 This document has been developed for professionals operating within the planning system. It provides them with a means of reaching sound decisions, having regard to the air quality implications of development proposals. It also is anticipated that developers will be better able to understand what will make a proposal more likely to succeed. This guidance, of itself, can have no formal or legal status and is not intended to replace other guidance. For example, industrial development regulated by the Environment Agency, and requiring an Environmental Permit, is subject to the Horizontal Guidance Note H¹, while for major new road schemes, Highways England has prepared a series of advice notes on assessing impacts and risk of non-compliance with limit values².

1.5 This guidance document is particularly applicable to assessing the effect of changes in exposure of members of the public resulting from residential and mixed-use developments, especially those within urban areas where air quality is poorer. It will also be relevant to any other form of development where a proposal could affect local air quality and for which no other guidance exists. This guidance is not intended to be applied to the assessment of air quality impacts on designated nature conservation sites³.

1.6 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'⁴ measures to **all developments**, to reduce both pollutant emissions and human exposure. It also provides guidance on how air quality considerations of individual

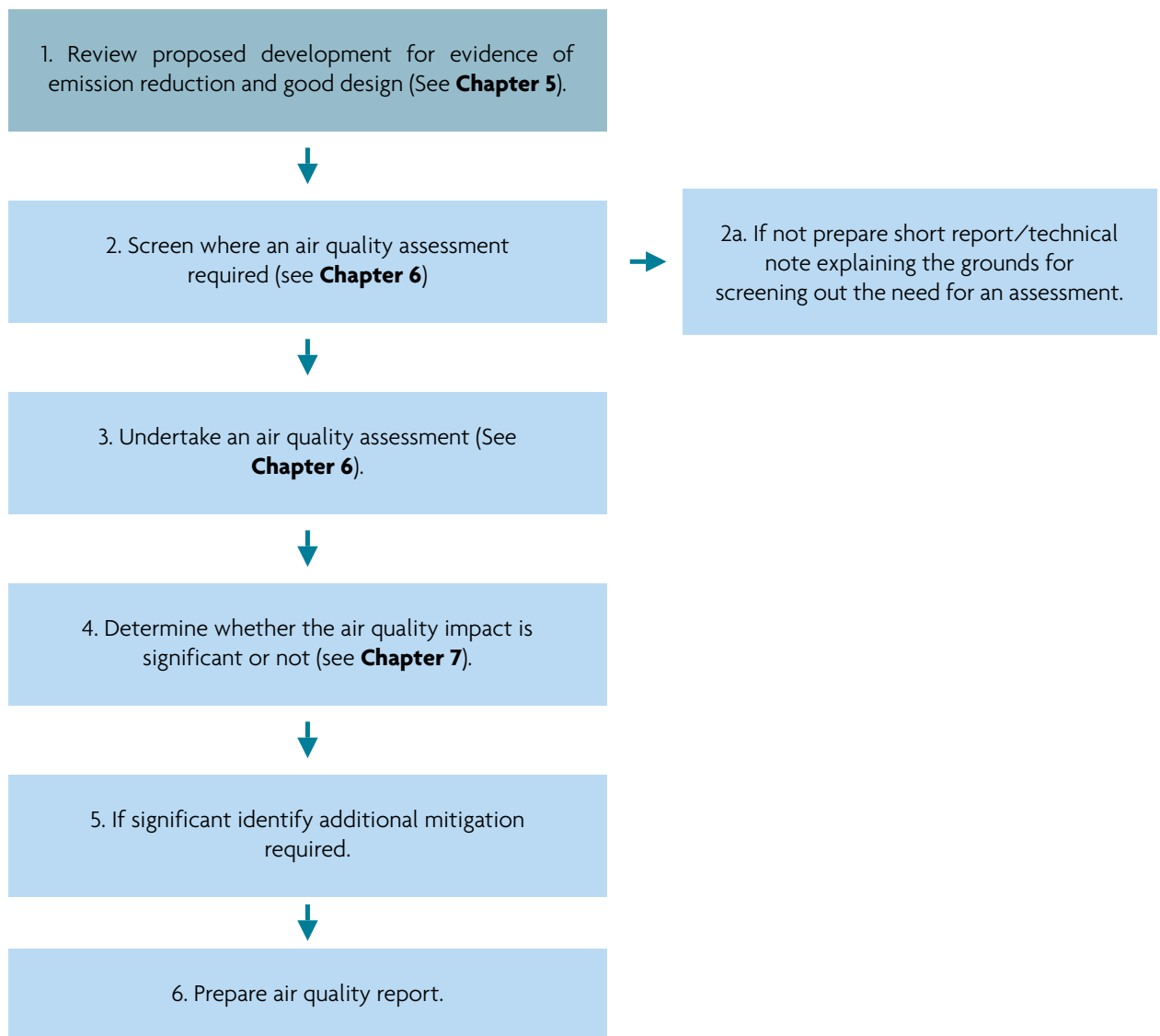
schemes may be considered within the development control process, by suggesting a framework for the assessment of the impacts of developments on local air quality.

1.7 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 **all developments** should incorporate good principles of design with regard to minimising emissions and the reduction of impacts on local air quality. 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**.

1.8 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 appropriate⁵.

1.9 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.

Figure 1: Procedure for Evaluating New Developments



¹ www.gov.uk/government/uploads/system/uploads/attachment_data/file/298239/geho0410bsil-e-e.pdf.

² www.standardsforhighways.co.uk/ians.

³ The IAQM and the Chartered Institute of Ecology and Environmental Management are considering (as of Spring 2015) where such guidance would be useful for professionals working in this area.

⁴ 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.

⁵ <http://iaqm.co.uk/guidance>.

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. For an individual development proposal, there may be associated emissions from transport or combustion processes providing heat and power.

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 NO_x 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 pollutants⁶, 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.

⁶ 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 not take decisions on individual proposals that 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 older⁷. 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%)⁸. 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 accidents⁹. 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)¹⁰. In 2013, the International Agency for Research on Cancer has identified outdoor air pollution as causing lung cancer, without identifying the specific pollutants that are the carcinogenic component¹¹.

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 an increasing awareness of evidence, as summarised in the HRAPIE review by the WHO¹², that chronic exposure to NO_2 may be important for premature mortality effects. The strength of this evidence is less than it is for the much larger body of evidence for particles, with regard to the use of a concentration-response function that is suitable for quantification of the impact on mortality. The evidence is considered by the Committee on the Medical Effects of Air Pollutants to be sufficient to conclude that NO_2 is causing some of the health effects observed in epidemiological studies¹³ and the Committee is considering recommendations for concentration-response functions. The



▲ Image: © Roger Barrowcliffe

strength of the association for NO₂ proposed by the HRAPIE review is such that it is comparable to that of PM_{2.5}, but only above a threshold of 20 µg/m³ as an annual mean.

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 SO₂ and NO_x. 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, for example. As noted in the **Introduction (paragraph 1.4)** this guidance is only addressing the assessment of impacts related to ecosystems.

3.6 The control of air pollution is the responsibility of local authorities and other government agencies through several Acts of Parliament and Regulations. Air pollution has many sources and knows no boundaries and consequently its control requires regulatory authorities and national government 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 may not achieve good air quality on its own. This is often achieved through many decisions made in different circumstances guided by a mosaic of policies that implemented together will create better air quality.

⁷ 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) www.gov.uk/government/publications/comeap-mortality-effects-of-long-term-exposure-to-particulate-air-pollution-in-the-uk

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

⁹ Comparing estimated risks for air pollution with risks for other health effects, Miller and Hurley, IOM (2006) www.iom-world.org/pubs/IOM_TM0601.pdf.

¹⁰ www.defra.gov.uk/environment/quality/air/air-quality/impacts/ 11 IARC Scientific Publication No. 161 Air Pollution and Cancer, Editors: K. Straif, A. Cohen, and J. Samet, 2013, Lyon

¹² www.euro.who.int/__data/assets/pdf_file/0006/238956/Health-risks-of-air-pollution-in-Europe-HRAPIE-project,-Recommendations-for-concentration-response-functions-for-costbenefit-analysis-of-particulate-matter,-ozone-and-nitrogen-dioxide.pdf.

¹³ COMEAP (2015) Statement on the Evidence for the Effects of Nitrogen Dioxide on Health, 12 March 2015 (<https://www.gov.uk/government/publications/nitrogen-dioxide-health-effects-of-exposure>).

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*¹⁴, 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)

4.2 The 2008 Planning Act¹⁵ 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 at district, county and unitary level 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:

- compliance with national air quality objectives and of EU Limit Values^{16,17};
- whether the development will materially affect any air quality action plan or strategy; and
- the overall degradation (or improvement) 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) and the Planning Policy Wales (PPW) set 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 state 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 "*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 that where Air Quality Action Plans prioritise measures in terms of costs and benefits, traffic noise¹⁸ 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 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.

Table 4.1: Context of air quality and planning in England.

Level	Relevant Documentation
National	National Planning Policy Framework Planning Practice Guidance Air Quality Strategy 2007
Regional	Regional Air Quality Strategy ^a
Local	Local Development Framework (LDF) Supplementary Planning Documents (SPD) Air Quality Action Plans Local Air Quality Guidance Neighbourhood Plans

^aFor example the Mayor's Air Quality Strategy in London

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 quality¹⁹. 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 means for assessing 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')²⁰. 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. The Community Infrastructure Levy is also relevant here.

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, Local Plan 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.

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

4.20 Some air quality assessments will be undertaken for development that falls within the scope of the Environmental Impact Assessment Regulations²¹. 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. It is also possible that the Habitats Regulations would invoke the need for an air quality assessment, should the development have potential for affecting a designated site of nature conservation at the European level, i.e. a Special Area of Conservation (SAC), a Special Protection Area (SPA) or a Ramsar site. Such an assessment is not part of this guidance, however.

Linkages with other relevant issues

4.21 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 through vehicles braking and then accelerating and the use of biomass boilers to reduce climate change impacts, which can increase

emissions of particulate matter and NO_x. It is important that these linkages are fully understood and taken into account to optimise the opportunities to enhance the sustainability of new developments. This may require the input of other specialists.

¹⁴ See www.pollutioncontrolonline.org.uk.

¹⁵ www.opsi.gov.uk/acts/acts2008/ukpga_20080029_en_1.

¹⁶ The duty to meet EU Limit Values is placed on the Secretary of State and not local government.

¹⁷ 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.

¹⁸ Local Air Quality Management Policy Guidance for Wales, Addendum Air Quality and Traffic Noise (2012).

¹⁹ Examples available at www.uwe.ac.uk/aqm/review/mplanspd.htm and www.lowemissionstrategies.org/downloads/LES_Good_Practice_Guide_2010.pdf.

²⁰ See www.communities.gov.uk/publications/planningandbuilding/circularplanningobligations.

²¹ The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 SI no. 1824.

5. Recommended Best Practice

Introduction

5.1 This section explains how all development proposals can adopt good design principles that reduce emissions and contribute to better air quality management. The roles of the local authority and developer/applicant in the process by which air quality and planning decisions are taken are set out and commentary is given on how both the strategic planning and development control processes can contribute to good practice for all new development. The flow chart in **Figure 2** below provides an overview of the whole process, defining the roles of the various parties and identifying opportunities for optimising the development proposal so as to reduce emissions. The concepts outlined in this section are applicable to all development and can be applied regardless of the outcome of any air quality assessment, as described in **Section 6**.

Overarching Concepts in Land Use Planning for Better Air Quality

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.

Making Better Use of the Land-use Planning System

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:

- Full integration of the inputs of the planning, transport, housing, education and environment departments to ensure that environmental considerations, including those related

to air quality, are considered at the earliest stages of the strategic planning processes;

- Ensuring public services are joined up and easier to access via public transport or other sustainable choices such as cycling and walking; and
- Giving careful consideration 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 Approaches to Reducing Emissions and Impacts

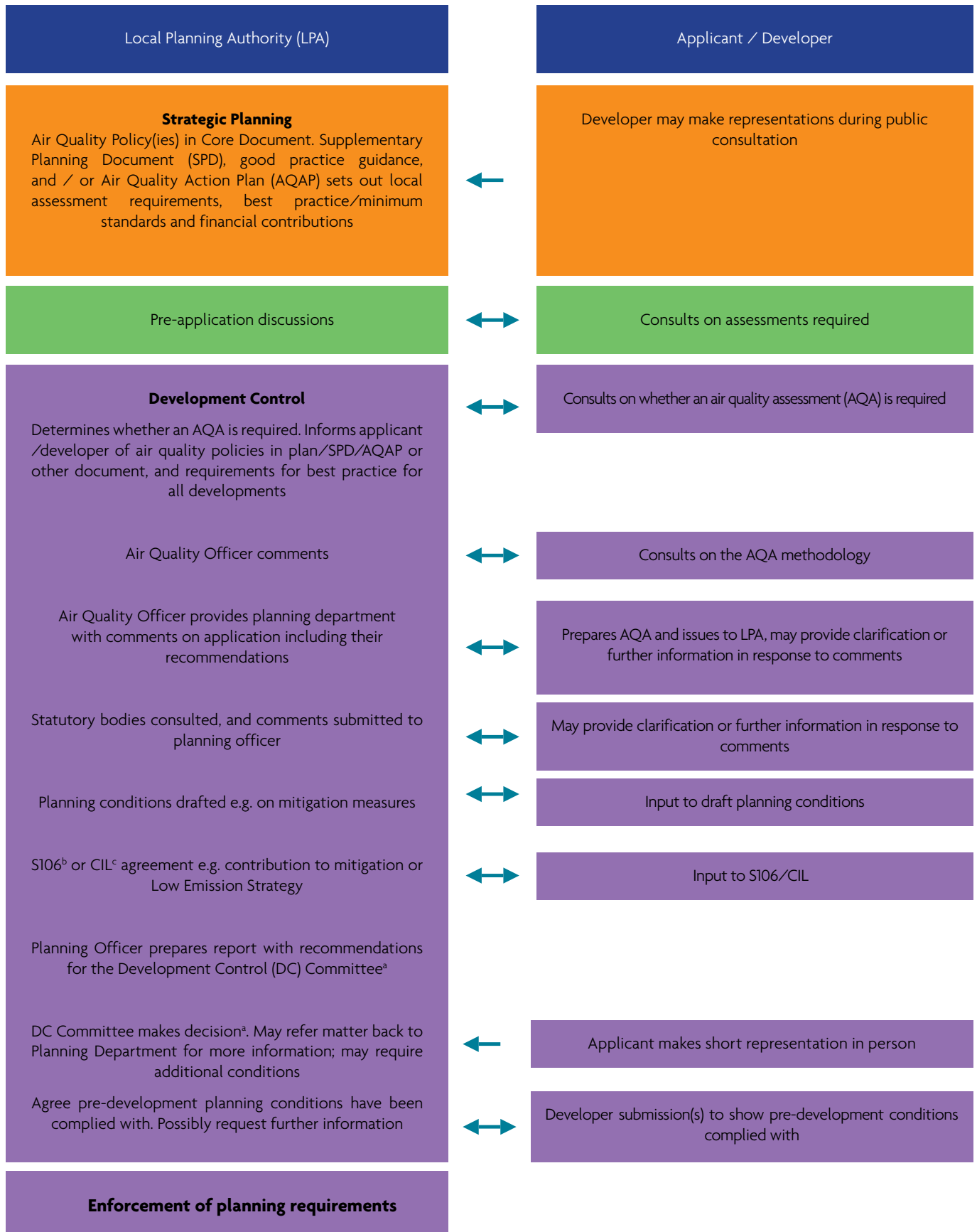
5.6 A particular concern of many local authorities is that individual developments are often shown to have a very small air quality impact, and, as a consequence, there are few mechanisms available to the planning officer to require the developer to achieve lower emissions. This, in turn, leads to concerns 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 good practice and design requirements 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 good 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 m² commercial floorspace; or

Figure 2: Role of Local Authority and Applicant/Developer in the planning process



^a Major applications are usually determined by the Development Control Committee; but in some cases the decision may be delegated to Planning Officers.

^b Section 106 of the Town and Country Planning Act 1990 (as amended)

^c Community infrastructure levy

BOX 1: Examples of Approaches to Reducing Emissions and Impacts

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:

- 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 also be considered in this context.

5.10 Principles of Good Practice

Good practice principles should be applied to **all** developments that have not been screened out using criteria such as those in **paragraph 5.8**. These cover both emissions and exposure, and address both the design and operational phases. Some examples of such principles include the following.

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;

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 NO_x 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.

- 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.

Operational phase

- The provision of at least 1 Electric Vehicle (EV) “rapid charge” point per 10 residential dwellings and/or 1000m² 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 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/Nm³⁻²² ;
 - Compression ignition engine: 400 mgNO_x/Nm³⁻²³;
- Gas turbine: 50 mgNO_x/Nm³⁻²⁴.
- 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:

Solid biomass boiler: 275 mgNO_x/Nm³ and 25 mgPM/Nm³⁻²⁵.

(These suggested emission benchmarks represent readily achievable emission concentrations by using relatively simple technologies. They can be bettered by using more advanced control technology and at additional cost over and above the 'typical' installation.)

5.11 Offsetting Emissions

In addition to these good practice principles, 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 boiler and CHP emissions are consistent with the standards 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 NO_x and PM₁₀ (kg/annum), based on emissions factors in the Emissions Factor Toolkit, and an assumption of an average speed of 50 km/h;
- Multiply the calculated emissions by 5, to assume emissions over a 5 year time frame;

Use the HM Treasury and Defra IGCB damage cost approach²⁶ to provide a valuation of the excess emissions, using the currently applicable values for each pollutant²⁷; and

- Sum the NO_x and PM₁₀ 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.

5.15 Measures to offset emissions may also be applied as post assessment mitigation.

²² At reference conditions of 273K, 101.3 kPa, 5%O₂ and 0% H₂O.

²³ At reference conditions of 273K, 101.3kPa, 5%O₂ and 0% H₂O.

²⁴ At reference conditions of 273K, 101.3 kPa, 15% O₂ and 0% H₂O.

²⁵ At reference conditions of 273K, 101.3 kPa, 6%O₂ and 0% O₂

²⁶ Dickens R, Gill J, Rubin and Butterwick M (2013) Valuing impacts on air quality: Supplementary Green Book guidance. HM Treasury and Defra.

²⁷ 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 new 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 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).

6.3 As set out in the introduction in **Chapter 1**, this guidance document is not intended to *replace* existing guidance that exists for certain types of development, notably:

- industrial developments that require a Permit;
- highways schemes promoted by Highways England; or
- activities associated with sources of dust (e.g. mineral extraction, waste handling, construction) or odours.

Separate guidance is available for these sources. Clearly, where new developments are located in the vicinity of such sources, the potential impacts of their operation on the proposed development will need to be considered. This should make use of the guidance for these other sources, adapted as necessary using professional judgement.

6.4 The matter of industrial development and the its regulation by the Environment Agency, Natural Resources Wales or a local authority deserves some further consideration in a planning

context. The 'HI' guidance provided by the Environment Agency alluded to above is intended (in part) to assist in the determination of Best Available Techniques for an installation regulated under IPPC²⁸. Where the risk of any potentially significant effect on the environment is identified using this methodology, further levels of pollution control may be required before an Environmental Permit is granted. This guidance document has been written so as to be complementary to HI and not a substitute for it. The HI methodology cannot be sufficient for an assessment accompanying a planning application, especially one undertaken for the EIA Regulations. In these circumstances, a framework is required that allows the assessor to describe the degree of impacts before reaching a conclusion on significance of the effects. The HI methodology provides some useful elements of such a framework and, where relevant, these have been used in this guidance, partly for reasons of consistency. It must be recognised, however, that the HI assessment methodology and the assessment guidance in this document serve different purposes. The former seeks to screen out insignificant emissions of individual pollutants and identify where there is a *risk* of a potentially significant effect on the environment through the release of some pollutants, whereas the latter is intended to provide a means of reaching a conclusion on whether the proposed development has a significant effect on local air quality, taking into account the overall degree of the impacts and other factors as appropriate. In each case, 'significance of effect' has a deliberately different meaning and context.

6.5 This document is not intended to address impacts on nature conservation sites, for which a different form of assessment is required.

The need for an air quality assessment

6.6 It is established good practice to consult with the Local Planning Authority (and/or its air quality specialists) to gain agreement on the need for an air quality assessment in support of a planning application and if one is required, the approach and methodology that will be used. The Planning Practice Guidance at paragraph 6 makes this point. 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.

6.7 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 and the location of existing and proposed human-health sensitive receptors.

6.8 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.

6.9 Where an air quality assessment is identified as being required, this may be either a Simple or a Detailed Assessment. A Simple Assessment is one relying on already published information and without quantification of impacts, in contrast to a Detailed Assessment that is completed with the aid of a dispersion model. Much of the discussion in this Section relates to Detailed Assessments.

6.10 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.

Impacts of the Local Area on the Development

6.11 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 NO₂), 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

6.12 In the case of an assessment of the impacts of a development in the local area, a two-stage approach is suggested. The **first stage** is intended to screen out smaller development and/or developments where impacts can be considered to have insignificant effects²⁹. The **second stage** relates to specific details regarding the proposed development and the likelihood of air quality impacts.

6.13 Stage 1 requires any of the criteria under (A) coupled with any of the criteria under (B) in **Table 6.1** 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.

Table 6.1 sets out the Stage 1 criteria designed to remove the need to assess impacts arising from small developments.

Table 6.1. Stage 1 Criteria

Criteria to Proceed to Stage 2
A. If any of the following apply:
<ul style="list-style-type: none"> • 10 or more residential units or a site area of more than 0.5ha • more than 1,000 m² of floor space for all other uses or a site area greater than 1ha
B. Coupled with any of the following:
<ul style="list-style-type: none"> • the development has more than 10 parking spaces • the development will have a centralised energy facility or other centralised combustion process
Note: Consideration should still be given to the potential impacts of neighbouring sources on the site, even if an assessment of impacts of the development on the surrounding area is screened out.

6.14 The criteria in **Table 6.2** 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. 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,

Table 6.2: Indicative criteria for requiring an air quality assessment

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. (LDV = cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight)	A change of HDV flows of - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere
3. Realign 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
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere
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 bio fuel - any combustion plant with thermal input >400kW - a standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year)

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 is likely to be more appropriate.

6.15 Where an air quality assessment is identified as being required, then this may take the form of either a Simple Assessment or a Detailed Assessment (see paragraph 6.9 for more details). In other words, passing a screening criterion in **Table 6.2** does not automatically lead to the requirement for a Detailed Assessment.

6.16 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. This should be agreed with the local planning authority. It may still be necessary to carry out calculations of emissions, as required by some location authorities (e.g. the GLA’s SPG on Sustainable Design and Construction (2014) or the Sussex Air Quality Partnership’s Air Quality and Emissions Mitigation Guidance for Sussex Authorities (2013) updated January 2014).

Content of an air quality assessment

6.17 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. Often 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.

6.18 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.

6.19 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 (the future 'baseline'). 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).

6.20 The cumulative impacts should also be considered. Therefore, there may be a case for modelling another future scenario, with committed development excluded, to allow the cumulative impact of all future developments to be assessed. In most circumstances it is more difficult to include other planning applications as the outcome is not certain.

6.21 The report prepared detailing the results of the assessment should contain the following information (but not necessarily in this order):

- 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 and any nearby sources that may affect the local air quality. 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.

d. *The basis for determining significance of effects arising from the impacts.* The descriptors used for describing the severity of 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 NO_x:NO₂ 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 normally be expected for modelling of road traffic emissions, but is not practicable for point-source modelling. If verification is not done, then some justification or explanation will be required. 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 monitoring data (and 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)³⁰. 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).
- 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. These maps are only available (at the time of writing) for 2013 and not for any future years.
- 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. A comment on the sensitivity of the results to input choices is desirable, so that a view can be taken of the uncertainties.
- j. *Description of construction phase impacts.* These impacts will relate primarily to dust emissions, which give rise to dust soiling and elevated PM₁₀ 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 IAQM³¹.
- 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, where appropriate, 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 good 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 PM₁₀ concentrations);
 - Impacts on existing receptors during operation (usually on concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5});
 - Impacts of existing sources on new receptors, particularly where new receptors are being introduced into an area of high pollution;
 - Any exceedences of the air quality objectives arising as a result of the development, or any 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.

6.22 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

6.23 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.

6.24 It is important to recognise that the focus of the procedures used by local authorities to prepare their LAQM 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).

6.25 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

6.26 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 effects of any impacts.

6.27 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).

6.28 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.

6.29 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.

6.30 For air quality impacts arising from surrounding sources on new occupants of a development then the impacts are best described in relation to whether or not the objective will be exceeded. An exceedance is likely to be considered as being significant.

6.31 In the case of the impacts of a development on the surrounding area, 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. (Note that impacts may be adverse or beneficial, depending on whether the change in concentration is positive or negative.)

6.32 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 at exposures that are below the standard³². 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 note³³, which can be used as the AQAL.

Table 6.3: Impact descriptors for individual receptors.

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	<1	2-5	6-10	>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. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as Negligible..
3. The Table is only designed to be used with annual mean concentrations.
4. 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 has a significant effect. Other factors need to be considered.
5. When defining the concentration as a percentage of the AQAL, use the ‘without scheme’ concentration where there is a decrease in pollutant concentration and the ‘with scheme;’ concentration for an increase.
6. 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.
7. 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.

6.33 The suggested framework for describing the impacts on the basis set out above is set out below in **Table 6.3**. The term AQAL is used to include air quality objectives or limit values, where these exist.

6.34 It is recommended that $PM_{2.5}$ is used to assess the impact of combustion sources (including road traffic) rather than PM_{10} . The AQAL³⁴ for $PM_{2.5}$ is much lower on the basis of the air quality objective and EU limit value and this therefore represents a more conservative approach. 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 using the limit value of $40 \mu\text{g}/\text{m}^3$ as an annual mean, or alternatively a derived value for the annual mean based on exceeding $50 \mu\text{g}/\text{m}^3$ for more than 35 days in a year (the equation in LAQM.TGO9 shows an annual mean of $32 \mu\text{g}/\text{m}^3$ equating to 35 days at or above $50 \mu\text{g}/\text{m}^3$).

6.35 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 data³⁵. Any rounding of the data should only be applied after any calculations have been completed.

6.36 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. The Environment Agency uses a threshold criterion of 10% of the short term AQAL as a screening criterion for the maximum short term impact. This is a reasonable value to take

and this guidance also adopts this as a basis for defining an impact that is sufficiently small in magnitude to be regarded as having an insignificant effect. 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.

6.37 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 when a plume from an elevated source affects airborne concentrations experienced by a receptor over an hour or less.

6.38 Impacts expressed using an averaging time of a day are not amenable to this form of assessment, since the plume spread will be much too wide over the course of a day, leading to a different kind of exposure to the peak short term concentrations. This is a problem chiefly with respect to PM_{10} and the expression of its limit value and objective. It is preferred that the annual mean AQAL is used for this pollutant.

6.39 Where such peak short term concentrations from an elevated source are in the range 10-20% of the relevant AQAL, then their *magnitude* 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 and the *severity* of this impact can be described as slight, moderate and substantial respectively, without the need to reference background or baseline concentrations. In most cases, the assessment of impact severity for a proposed development 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 substantial 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.

²⁸ Integrated Pollution Prevention and Control.

²⁹ 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 latter still requires a calculation of emissions even if an assessment is not required.

³⁰ See www.defra.gov.uk/environment/airquality/local/guidance/pdf/tech-guidance-laqm-tg-09.pdf.

³¹ <http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>.

³² 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**).

³⁴ An annual mean of $20 \mu\text{g}/\text{m}^3$ for $PM_{2.5}$, by 1 January 2020, compared with $40 \mu\text{g}/\text{m}^3$ for PM_{10} .

³⁵ 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 $0.2 \mu\text{g}/\text{m}^3$ for the annual mean nitrogen dioxide concentration from 40.2 to $40.4 \mu\text{g}/\text{m}^3$ would be presented as $40 \mu\text{g}/\text{m}^3$ without and $40 \mu\text{g}/\text{m}^3$ with the scheme, while the same change applied to $40.4 \mu\text{g}/\text{m}^3$ without to $40.6 \mu\text{g}/\text{m}^3$ with the scheme, would be presented as $40 \mu\text{g}/\text{m}^3$ without and $41 \mu\text{g}/\text{m}^3$ with the scheme.

7. Assessing Significance

7.1 Impacts on air quality, whether adverse or beneficial, will have an effect on human health 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, 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 of effect, but there will be other influences that might need to be accounted for. The impact descriptors set out in **Table 6.3** 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 necessarily be judged as being significant in some circumstances.

7.5 One of the relevant factors in the judgement of the overall significance of effect 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.

7.6 Often, it is possible to be very clear when an impact is sufficiently slight that it has no effect on receptors and can therefore be described unequivocally as ‘not significant’³⁶. In the opposite case, when an impact is clearly substantial, 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 the overall significance of effect of a development 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; and
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Other factors may be relevant in individual cases.

7.8 A judgement of the significance should be made by a competent professional who is suitably qualified. The reasons for reaching the conclusions should be transparent and set out logically. Whilst the starting point for the assessment of significance is the degree of impact, as defined by **Table 6.3**, this should be seen as one of the factors for consideration, not least because the outcome of this assessment procedure applies to a receptor and not the overall impact.

7.9 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. In reality, therefore, it is the impact on local air quality that is used as a proxy for assessing effects on health.

7.10 There are no viable 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. Any judgement on the significance of effects on health is part of a Health Impact Assessment and not the air quality assessment being described here.

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 exceedance of an objective to any individual source.

7.12 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.

³⁶ 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.

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 mitigating these residual impacts, 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 proposed should be quantified.

8.2 The type of measures proposed to reduce air quality impacts 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 wider measures could 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 to 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. For some smaller developments with combustion sources, there is often considerable scope for optimising the stack location and height such that dispersion is enhanced. This is an aspect that is often neglected in the design and layout of buildings.

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
- AAOT:** 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
- NO₂:** Nitrogen dioxide
- NO_x:** Oxides of nitrogen
- NPPF:** National Planning Policy Framework
- NRW:** Natural Resources Wales
- PM₁₀ and PM_{2.5}:** Particulate matter with an aerodynamic diameter of less than 10 microns (m) (PM₁₀) or less than 2.5µm (PM_{2.5}), 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.
- SO₂:** Sulphur dioxide
- TAN:** Technical Advice Note
- VPD:** Vehicles per day
- WG:** Welsh Government

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