Gedling Borough Council

in collaboration with

East Midlands Air Quality Network

Air Quality and Emissions Mitigation

Guidance for Developers

2019

Summary

The environment can impact negatively on the health and wellbeing of the population and of all the environmental factors, air pollution has the greatest impact. Current evidence indicates that air pollution is associated with cardiovascular disease, lung cancer, respiratory disease, asthma and stroke. Air pollution disproportionately affects the young, older people, those with underlying cardiopulmonary conditions and the most deprived within our communities.

In the UK, the mortality burden of exposure to human-made air pollution is estimated as an annual effect equivalent to between 28,000 and 36,000 deaths a year, with an associated loss of life of between 328,000 and 416,000 years[1]. For the East Midlands, it has been estimated as an annual effect equivalent to 2,314 deaths, with an associated loss of life of 24,016 life-years attributable to particulate air pollution only[2]

This technical planning guidance for Gedling Borough Council has been prepared in conjunction with the East Midlands Air Quality Network (EMAQN) and has been developed to supplement the National Planning Policy Framework (NPPF)[3]. This guidance will be reviewed and updated in light of any specific future national and local policy changes.

This document aims to improve air quality across the East Midlands and thus improve the environment and health of the population. This will be achieved where possible through either preventing new emission sources or encouraging emission reductions, physical activity and health lifestyle choices. It aims to provide a consistent approach to air quality in the planning regime across the East Midlands. In producing this document the Council aims to provide developers with clear information as to what is required and how planning applications are evaluated in terms of air quality, which should help to speed up the planning process.

The document deals primarily with the air quality impacts from traffic emissions (the main contributor to ambient air pollution), however, point source emissions e.g. generators, incinerators, power plants and other potentially significant industrial/commercial sources of air pollution including the increasing use of biomass boilers are important local planning issues. The assessment and control of dust impacts during demolition and construction is also considered, as dusts contribute to airborne particulate matter. Greenhouse gas emissions are not addressed explicitly, as they are covered by other initiatives, but synergies exist between measures to minimise climate change and local air quality impacts.

It is recognised that new development will in the main inherently increase road transport emissions, both during the construction and operational phases. However, it is also recognised that sustainable development can be a positive force for change. The approach in this document seeks to minimise or offset road transport emissions wherever practicable, by securing reasonable emission mitigation while also seeking to counter the cumulative impacts arising from all developments and maximise potential benefits to health and the environment.

[1] Committee on the Medical Effects of Air Pollutants (COMEAP) - Associations of long-term average concentrations of nitrogen dioxide with mortality. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734799/COMEAP_NO2_Report.pdf [Accessed 14/03/19].

[2] Gowers, A. M., Miller, B. G. & Stedman, J. R. 2014. PHE-CRCE-010 Estimating Local Mortality Burdens associated with Particulate Air Pollution. Available: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332854/PHE_CRCE_010.pdf [Accessed 26/07/16].

[3] Department for Communities and Local Government - National Planning Policy Framework - https://www.gov.uk/government/publications/national-planning-policy-framework--2

A key theme of the National Planning Policy Framework (NPPF) is that developments should enable future occupiers to make green vehicle choices and it explicitly states that low emission vehicle infrastructure, including electric vehicle re-charging, should be provided. This document seeks to develop consistent EV re-charging standards for new developments across the East Midlands.

An 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.

The air quality assessment process follows a staged process:

1. Using the '*Screening checklist*' to determine whether the proposal qualifies as a 'small', 'medium' or 'large' development;

2. Determining whether the development requires an air quality assessment or emissions assessment using the '*Air quality and emission mitigation assessment checklist*';

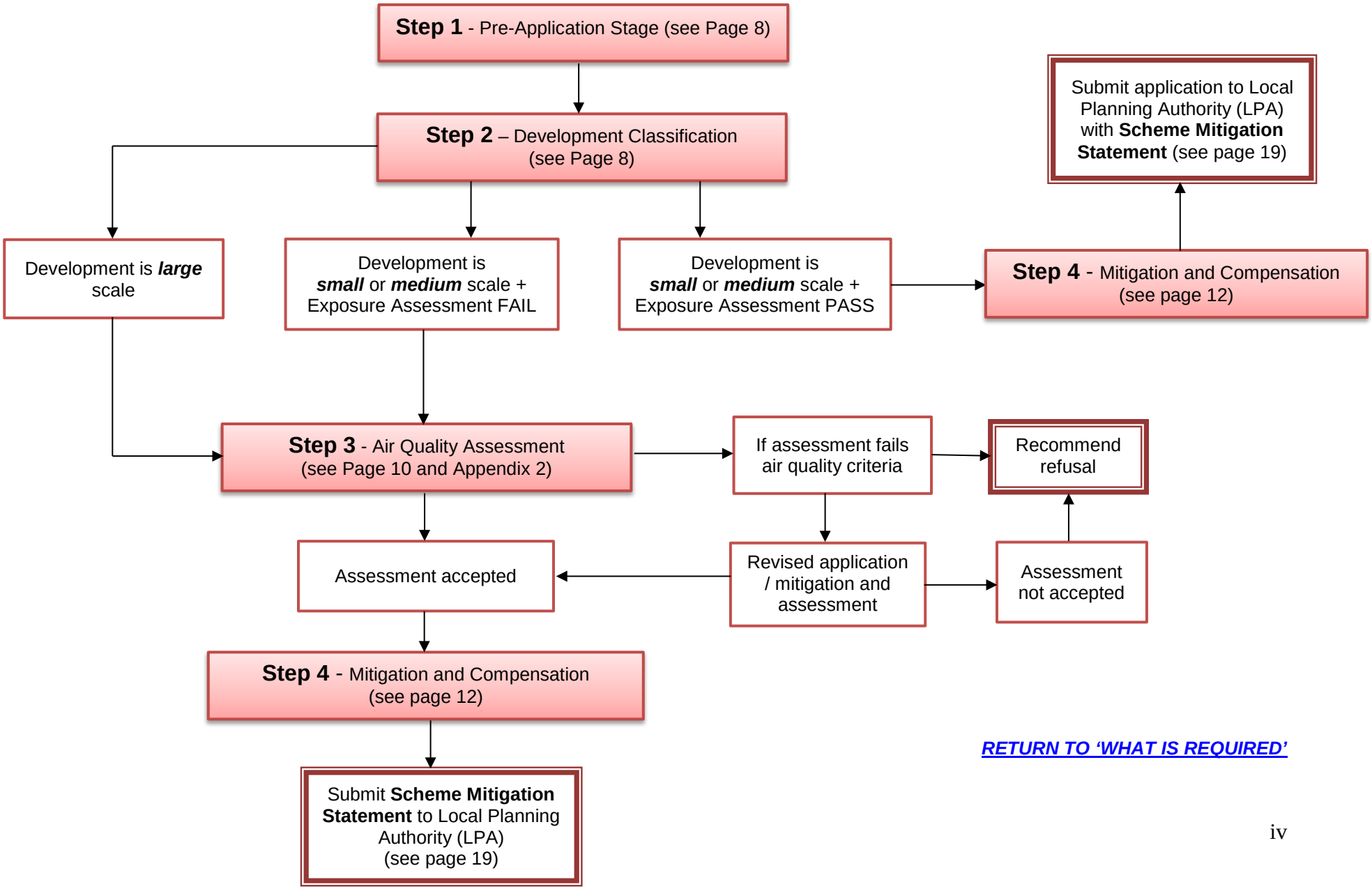
3. Determining whether additional assessment is required to assess the impact on public health and/or the local environment as well as the significance of a development on local air quality; and

4. Determining whether an application should be refused on air quality grounds or what mitigation measures are required to make the development acceptable on air quality grounds.

Acknowledgment
This document has been based on work carried out by West Midlands Low Emissions Towns & Cities Programme, West Yorkshire Councils, Kent & Medway Air Quality Partnership and the Sussex Air Quality Partnership. Dust Management Guidance has been based on guidance produced by Wakefield Council.

Our thanks are extended to them for their assistance in drafting this document.

Quick Reference Guide: Air Quality Assessment/Mitigation Process



RETURN TO 'WHAT IS REQUIRED'

Contents

Introduction

Purpose of this Guidance

It is recognised that new development will in the main inherently increase road transport emissions, both during the construction and operational phases. However, it is also recognised that sustainable development can be a positive force for change. The approach in this guidance seeks to maximise potential benefits to health and the environment, minimise road transport emissions wherever practicable to sustainable levels, and to counter the cumulative impacts arising from the emissions arising from new development schemes over time.

Although the focus of this guidance concerns air quality issues primarily arising from road transport emissions, it also considers the related benefits of tackling greenhouse gas and noise emissions from road transport as additional benefits. Separate guidance is available to assist developers when considering emissions from other sources, including point sources (eg, biomass installations).[4]

The NPPF introduces the presumption that planning approval will be granted for *sustainable development*. This guidance document seeks to define what is meant by 'sustainable' in air quality terms in order to provide consistency and clarity to local authority practitioners and developers alike.

A key consideration in the NPPF is the cumulative impact of development on pollution levels; therefore, this guidance seeks to simplify assessment and mitigation procedures through a standardised development scheme classification, according to potential scheme impact, while recommending the types of appropriate and reasonable mitigation measures that should be designed into each scheme classification.

The process outlined below provides an indicative step by step approach to dealing with planning applications that have the potential to create relevant exposure to road transport emissions (nitrogen dioxide (NO_2) and particulate matter ($PM_{10/2.5}$)) for future occupants of a development, or where the proposed development scheme has the potential to increase concentrations of pollutants in the surrounding area arising from road transport emissions.

[4] EPUK guidance available at http://www.iaqm.co.uk/text/guidance/epuk/biomass_developers_leaflet.pdf

A basic hierarchy of principles is used as the basis for mitigating the operational air quality impacts associated with development schemes.

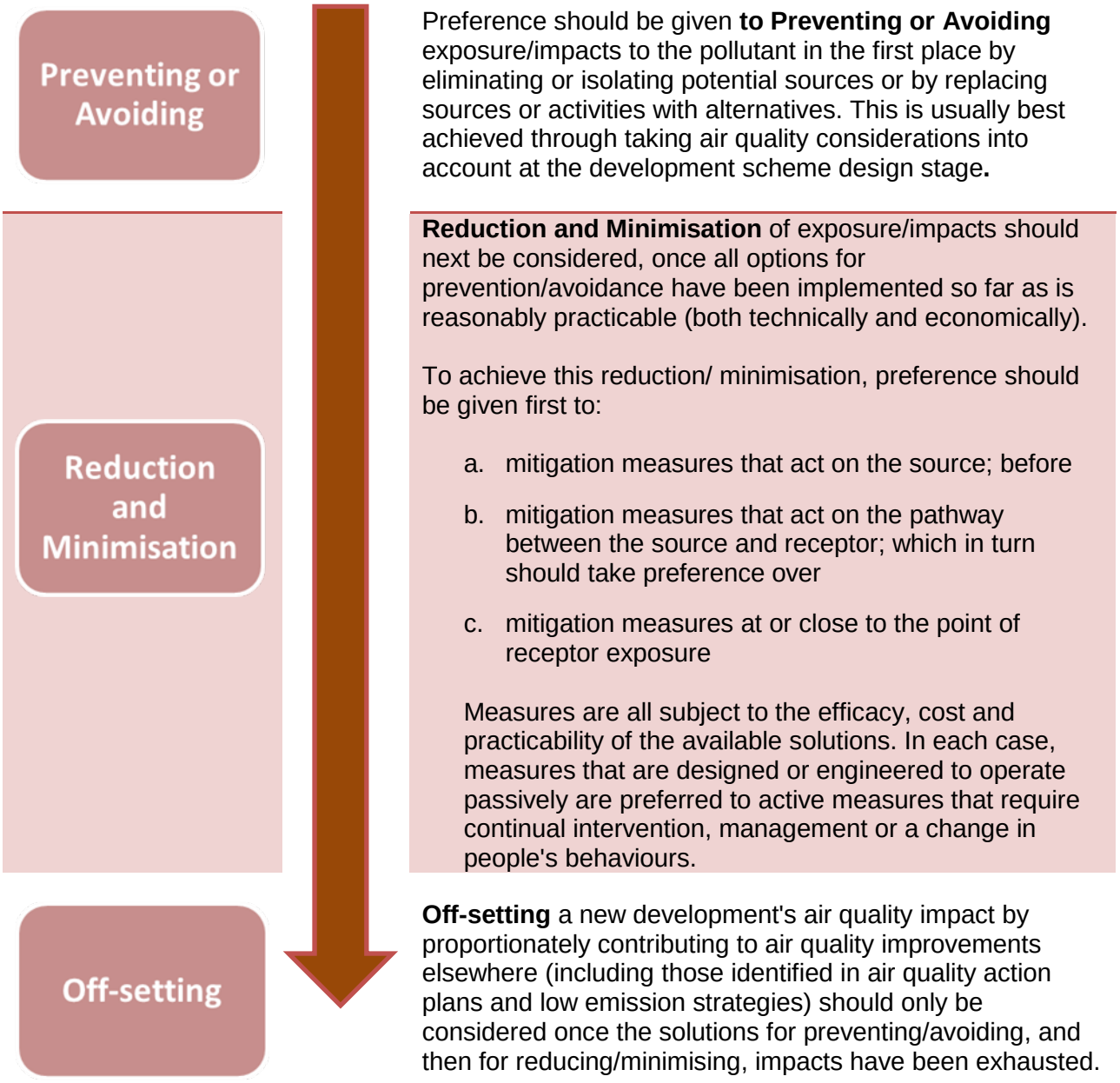


Figure 1: Hierarchy of air quality mitigation for development[5]

By incorporating mitigation measures into scheme designs as standard, this approach helps to counteract incremental increases in air pollution associated with cumulative development over time.

[5] *Position Statement – Mitigation of Development Air Quality Impacts, January 2015* http://iaqm.co.uk/text/position_statements/mitigation_of_development.pdf

Air Pollution – What's the Problem?

Air pollution is the largest contributor to the burden of disease from the environment which impacts on the whole population. Current evidence indicates that air pollution is associated with cardiovascular disease, lung cancer, respiratory disease, asthma and stroke. Air pollution disproportionately affects the young, older people, those with underlying cardiopulmonary conditions and the most deprived within our communities.

Figure 2: Sources of air pollution including oxides of nitrogen (NOx) and fine particular matter (PM2.5)[6]

How does it affect my health?

Health effects are mainly related to long-term exposure to particulate air pollution ($PM_{2.5}$) and nitrogen dioxide (NO_2) (Appendix 1). The primary sources of these pollutants are shown in Figure 2.

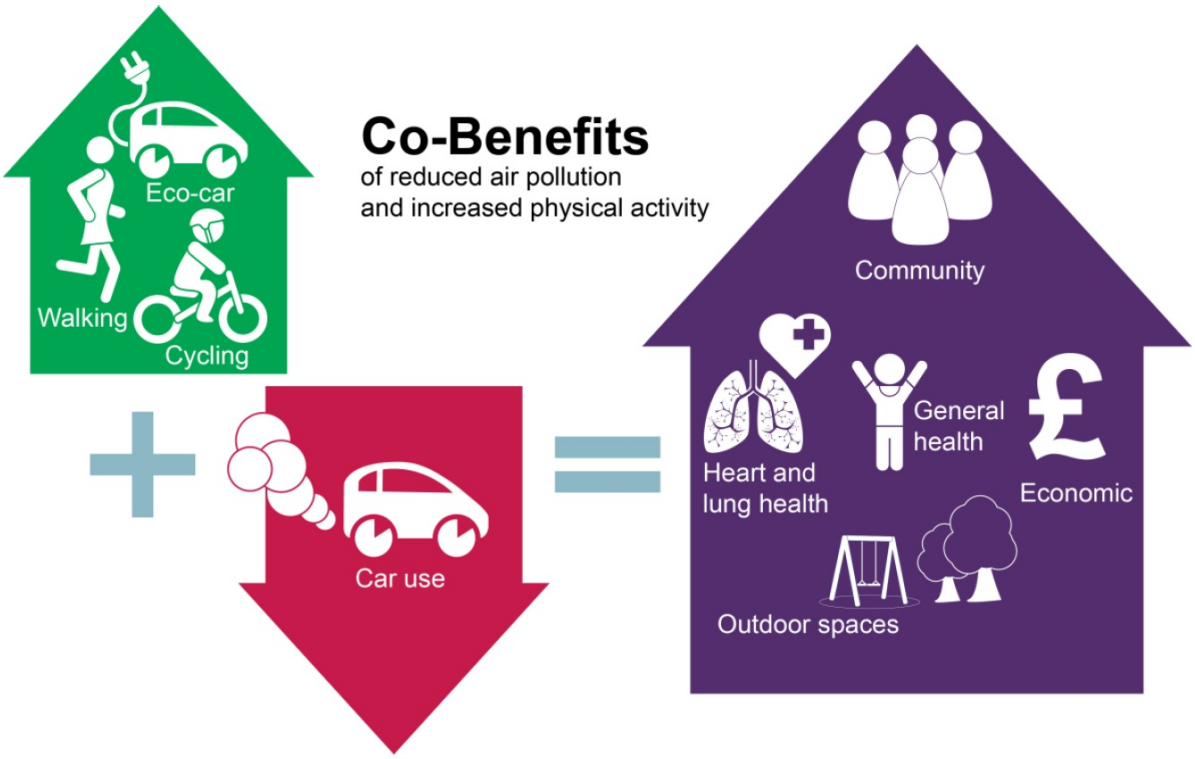
In the UK, the mortality burden of exposure to human-made air pollution is estimated as an annual effect equivalent to between 28,000 and 36,000 deaths a year, with an associated loss of life of between 328,000 and 416,000 years[1]. (Appendix 1 - Air pollution and health).

[6] Department for Environment, Food and Rural Affairs (DEFRA), Public Health England (PHE). Air Quality A Briefing for Directors of Public Health, March 2017 - http://www.local.gov.uk/sites/default/files/documents/6.3091_DEFRA_AirQualityGuide_9web_0.pdf

The financial implications arising from the health burden associated with air pollution are considerable. The Department for Environment, Food & Rural Affairs (DEFRA) have estimated the annual health costs for UK citizens to be in the region of £15 billion (range: £8-17 billion). As a comparison the health costs arising from obesity have been estimated to be around £10 billion per year.

Interventions that improve air quality and health deliver one or more of these high-level outcomes:

- Source reduction – reducing the sources of air pollution;
- Exposure reduction – reducing people's exposure to air pollution; and/or
- Improving physical and/or mental health.



Source: *Air Pollution and Public Health;* 2017035, PHE 2017

The health evidence is unequivocal: any reduction in air pollution – even below limit values – will directly benefit public health, as pollutants such as nitrogen dioxide and particulate matter show no threshold below which health effects do not occur.

Air Pollution in Gedling Borough

The Environment Act 1995 established the Local Air Quality Management (LAQM) regime. LAQM requires Local Authorities to review and assess ambient air quality in their areas against health-based standards for a number of specific pollutants prescribed in the Air Quality Regulations 2000 and Air Quality (Amendment) Regulations 2002. If there is a risk that levels of air pollution in any part of the authority's area will be higher than the prescribed objectives, the authority is required to designate an Air Quality Management Area (AQMA). It is then required to produce an Air Quality Action Plan, which sets out the measures it intends to take in pursuit of the objectives.

The main pollutants of concern in the Borough relate to the tail pipe emissions from motor vehicles. As such the main commuter routes into Nottingham, through the Borough, are the main areas of concern. Nitrogen Dioxide is the primary pollutant of concern in the Borough; Gedling Borough has an AQMA along the A60 Mansfield Road.

For more information see: **LINK TO GBC AIR QUALITY WEBPAGE**

Public Health England has included an indicator in the Public Health Outcome Framework relating to air quality[7]. The indicator is a summary measure of the impact on death rates of long term exposure to man-made particulate air pollution. The indicator underlines the scale of the health impact and the fact that it is modifiable. Table 1 shows the estimated mortality burden in Nottinghamshire associated with particulate air pollution[1].

Table 1: Mortality burdens associated with particulate air pollution in Nottinghamshire

Area	Attributable deaths	Associated life years lost	Attributable Fraction
England	25,002	264,749	5.6%
East Midlands	2,314	24,016	5.7%
Nottingham UA	150	1,559	6.4%
Nottingham CC	430	4,270	5.7%
Ashfield	68	662	5.7%
Bassetlaw	61	620	5.3%
Broxtowe	62	612	6.1%
Gedling	**63**	**628**	**5.8%**
Mansfield	57	594	5.6%
Newark and Sherwood	63	626	5.4%
Rushcliffe	56	528	5.8%

[7] Department of Health. Public Health Outcomes Framework 2013 to 2016, last updated 2015. Available at http://www.phoutcomes.info/public-health-outcomes-framework#page/3/gid/1000043/pat/6/par/E12000004/ati/102/are/E06000015/iid/30101/age/230/sex/4

Air Pollution and Planning Policy – National Context

National Planning Policy Framework (NPPF)[3] states that the purpose of the planning system is to contribute to the achievement of sustainable development through three interdependent objectives; economic, social and environmental and states that:

*'**an environmental objective** – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'*

(Paragraph 8)

Paragraph 181 highlights that planning decisions should ensure that new development in AQMAs and Clean Air Zones are consistent with the Council's local air quality action plan, and local policies should contribute to meeting relevant limit values and national objectives for air quality.

The NPPF Chapter 9 *Promoting Sustainable Transport* outlines how transport issues should be considered including:

'…

c) opportunities to promote walking, cycling and public transport use are identified and pursued;

d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains;

…' [Para. 102]

Paragraph 103 highlights that '*Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making*.'

More generally planning policies should:

'…

d) provide for high quality walking and cycling networks and supporting facilities such as cycle parking

…' [Para. 104]

The NPPF also states that:

'If setting local parking standards for residential and non-residential development, local planning authorities should take into account:

'….

- *the availability of and opportunities for public transport;*
- *the need to ensure an adequate provision of spaces for charging plug-in and other ultra-low emission vehicles.'*

…' [Para. 105]

The NPPF is less clear whether impacts on air quality at levels below the National Air Quality Objectives can be a material planning consideration. However, the health evidence is unequivocal: any reduction in air pollution – even below limit values – will directly benefit public health, as pollutants such as nitrogen dioxide and particulate matter show no threshold below which health effects do not occur.

Currently, there is no statutory guidance on how to deal with air quality considerations through the planning system. Most guidance concerns itself with technical modelling of impacts, with little information provided on how best to mitigate impacts. Gedling Borough has taken the approach developed and adopted by councils in West Midlands, West Yorkshire, Kent & Medway and Sussex areas that simplifies the assessment of air quality impacts for development schemes and places more emphasis on incorporating standard road transport emission mitigation measures.

Each development dealt with through the planning system will have an impact on local air quality through road traffic it generates, for example, private traffic associated with residential schemes or deliveries to commercial schemes. By securing standard emission mitigation measures on each scheme, cumulative impacts arising from development over time can be minimised and health benefits can be maximised. This approach provides clarity and consistency for developers up front regarding what is required of new developments, which should help to speed up the planning process.

Air Pollution and Planning Policy – Local Context

The Adopted Local Planning Document (2018) addresses both non-strategic site allocations and generic development management issues; policies within the document are used to determine planning applications. Policy LPD11 makes reference to this guidance in the assessment and mitigation of air quality impacts of development.

Policy LPD 11 - Air Quality

Planning permission will not be granted for development proposals that have the potential to adversely impact on air quality, unless measures to mitigate or offset their emissions and impacts have been incorporated, in accordance with the Borough Council's Air Quality and Emissions Mitigation guidance and other associated guidance documents.

In areas where air quality is a matter of concern, development proposals will be required to deliver a positive impact on air quality.

Development proposals must not exacerbate air quality beyond acceptable levels, either through poor design or as a consequence of site selection.

Development around areas where air quality is of concern

The overriding consideration will be to ensure that the air quality in existing AQMA(s) does not worsen by the introduction of a development and/or that there is no additional air pollution burden from a development(s) which could create new AQMAs.

Policy LPD11 indicates that: '*In areas where air quality is a matter of concern, development proposals will be required to deliver a positive impact on air quality*'.

It may be therefore appropriate, in some circumstances, for the developer to fund additional mitigating measures (such as those found in the Air Quality Action Plan) to offset any increase in emissions as a consequence of the proposed development; thereby positively impacting the AQMA(s). Measures above and beyond the mitigation required for the development itself will be encouraged.

The scale and cost of any additional mitigation measures would be quantified using the emission impact(s) of the development on air quality with this then calculated in terms of a monetary damage cost. The process for the calculation of damage costs is discussed later and set out in Appendix 4.

The Mitigation Statement should outline all mitigation measures proposed.

These additional mitigation measures can be secured by either planning condition or Planning Obligation by a Section 106 Agreement(s) to make the site acceptable, using reasonable endeavours.

Refusal of a planning application may still result if air quality impacts from a development remain; even after all reasonable means to mitigate the impacts on air quality have been exhausted.

Assessment and Mitigation – What is required?

SEE - Quick Reference Guide: Air Quality Assessment Process

Step 1 – Pre-Application Stage

It is important that planning authority requirements regarding scheme sustainability and the planning application validation process are identified at the earliest stage possible.

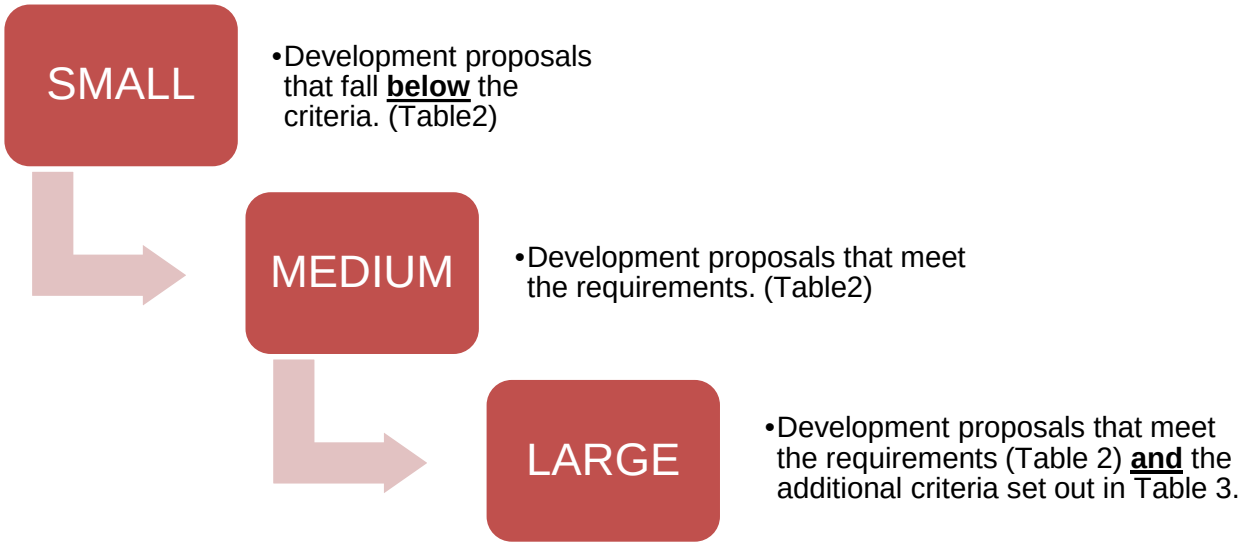
For this reason pre-application discussion involving planning management, air quality and public health professionals should take place at the outset to ensure optimum scheme design and avoid unnecessary delays in the planning process. This is particularly pertinent in relation to major schemes.

Step 2 – Classification of the Development

Three levels of development scale have been categorised using the DfT Threshold Criteria for Transport Assessments[8] in addition to DEFRA Technical Guidance [TG (16)][9]; into **small, medium** and **large** classifications (See below).

This is not limited to developments leading to a significant change in road traffic flows or other transport sources, but also includes any development that may affect air quality, with relevant exposure nearby, should be such as:

- Industrial installations;
- Biomass boilers;
- Combined Heat and Power (CHP) plant;
- Landfill sites, quarries, etc.



[8] The Department for Transport (DfT) Threshold criteria for Transport Assessments and Travel Plans (TA/TP) http://webarchive.nationalarchives.gov.uk/20100409053417/http://www.dft.gov.uk/adobepdf/165237/202657/guidanceontaappendixb

[9] Department for Environment, Food and Rural Affairs (DEFRA) - Local Air Quality Management Technical Guidance (TG16) (April 2016). Available at https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

Table 2: Development Classification

Land Use	Description	Criteria
Food Retail (A1)	Retail sale of food goods to the public – supermarkets, superstore, convenience food store	>800 m^2 (GFA)
Non-Food Retail (A1)	Retail sale of non-food goods to the public; but includes sandwich bars or other cold food purchased and consumed off site	>1500 m^2(GFA)
Financial and professional services (A2)	Banks, building societies and bureaux de change, professional services, estate agents, employment agencies, betting shops.	>2500 m^2(GFA)
Restaurants and Cafes (A3)	Use for the sale of food for consumption on the premises.	>2500 m^2(GFA)
Drinking Establishments (A4)	Use as a public house, wine-bar for consumption on or off the premises.	>600 m^2(GFA)
Hot Food Takeaway (A5)	Use for the sale of hot food for consumption on or off the premises.	>500 m^2(GFA)
Business (B1)	Offices other than in use within Class A2 (financial & professional). Research & development – laboratories, studios. Light industry	>2500 m2(GFA)
General industrial (B2)	General industry (other than B1).	>4000 m^2(GFA)
Storage or Distribution (B8)	Storage or distribution centres – wholesale warehouses, distribution centres & repositories.	>5000 m^2(GFA)
Hotels (C1)	Hotels, boarding houses & guest houses	>100 bedrooms
Residential Institutions (C2)	Hospitals, nursing homes used for residential accommodation and care.	>50 beds
Residential Institutions (C2)	Boarding schools and training centres	>150 students
Residential institutions (C2)	Institutional hostels, homeless centres.	>400 residents
Dwelling Houses (C3)	Dwellings for individuals, families or not more than six people in a single household.	>50 units
Non-Residential Institutions (D1)	Medical & health services, museums, public libraries, art galleries, non-residential education, places of worship and church halls.	>1000 m^2(GFA)
Assembly and Leisure (D2)	Cinemas, dance & concert halls, sports halls, swimming, skating, gym, bingo, and other facilities not involving motorised vehicles or firearms.	>1500 m^2(GFA)

Additional Considerations

1. Any development generating 30 or more two-way vehicle movements in any hour
2. Any developments generating 100 or more two-way vehicle movements per day
3. Any development proposing 100 or more parking spaces
4. Any relevant development proposed in a location adjacent to an Air Quality Management Area (AQMA)

Table 3: Additional Trigger Criteria for Large Developments

The development will:	Indicative Criteria
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 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).

Based on Table 6.2: *Indicative criteria for requiring an air quality assessment* ; IAQM; *Land-Use Planning & Development Control: Planning For Air Quality*; Jan 2017
AADT – Annual Average Daily Traffic

Step 3 – Assessment

Small and Medium Scale Proposals

Smaller development proposals may not in themselves create an additional air quality problem but will add to local air pollution and potentially introduce more people likely to be exposed to existing levels of poor air quality. An assessment of the likelihood of introducing additional exposure will be determined using the following criteria:

- The proposal is adjacent to or within an AQMA;
- The proposal is one of the Land Use types:
    - C1 to C3 in Table 2;
    - C4 (Homes of Multiple Occupation);
    - D1 in Table2.

  and within 20m of roads with >10,000 AADT.

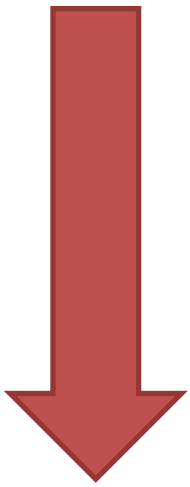
The outcome of the exposure assessment will determine the level of mitigation required make the development acceptable. **Should there be no acceptable mitigation the recommendation to the planning officer will be to consider refusing the proposal on air quality grounds**.

Large Scale Proposals

The scale and nature of this type of proposal is such that a detailed air quality assessment will be required to determine the impact on public health and the local environment. The assessment requires:

1. The identification of the level of exposure through the change in pollutant concentrations including cumulative impacts arising from the proposal, during both demolition/construction operations and operational phases. Mitigation measures should be identified and modelled where practicable.

2. The calculation of pollutant emissions costs from the development:



A. The methodology to be used for the determination of pollutant concentration change should meet the requirements of the DEFRA Technical Guidance Note LAQM TG(16).

Further details of the air quality assessment requirements are shown in **Appendix 2**.

B. The pollutant emissions costs calculation will identify the environmental damage costs associated with the proposal and determine the amount (value) of mitigation that is expected to be spent on measures to mitigate the impacts.

The calculation utilises the most recent DEFRA Emissions Factor Toolkit to estimate the additional pollutant emissions from a proposed development and the latest DEFRA IGCB Air Quality Damage Costs for the specific pollutant of interest, to calculate the resultant damage cost. **See Appendix 4**

Table 3 below summarises the type of assessment, mitigation and/or compensation required for each of the development classifications.

Table 3: Summary of the Air Pollution Mitigation Requirements

Development Scale	Assessment Required	Mitigation	Compensation
Small	None (other than for exposure)	Type 1	-
Medium	None (other than for exposure)	Type 1 and 2	-
Large	Full AQ Assessment in line with Council Guidance, including evaluation of emission and concentration changes.	Type 1 and 2	Type 3

Step 4 – Mitigation and Compensation

This guidance assumes that small and medium schemes should not have a significant impact on air quality if the appropriate Type 1 and 2 mitigation, as outlined, is incorporated into development proposals. Where appropriate mitigation has been incorporated, such schemes can be considered as being sustainable in air quality terms.

In addition to Type 1 and Type 2 mitigation, large schemes may require additional Type 3 mitigation which is determined in scale by the calculation of emission damage costs associated with the scheme.

The required mitigation is summarised below, and further detail is provided in the following section:

Table 4: Summary of the Potential Air Pollution Mitigation

Type 1	• The adoption of an agreed protocol to control emissions from construction sites • Provision of Electric Vehicle Recharging • Low NOx boilers or consideration of alternative heat sources
Type 2	Practicable mitigation measures supported by the NPPF; **Table 7** Active travel (cycling/walking) infrastructure including, but not limited to: • Developing cycle routes or pedestrianised areas and infrastructure to support low emission modes of transport; • improved facilities to encourage cycling or other non-motorised travel (shower facilities, secure cycle storage etc); and signage
Type 3	Additional measures that may be required by either planning condition or Planning Obligation by a Section 106 Agreement to make the site acceptable, using reasonable endeavours. The Type 2 & 3 mitigation measures presented in this guidance are not exhaustive lists and should be seen as defaults. Innovative solutions to air quality mitigation are encouraged.

The type of mitigation agreed will be informed by:

- Outcomes from the Transport Statement/ Assessment;
- Specific needs identified in site specific spatial policy allocations;
- Travel Awareness/Planning and Highway Development requirements;
- Defra air quality guidance

Type 1 - Mitigation Measures

I. Construction Dust Emissions

See *Construction Phase - Emissions Mitigation and Assessment* section below.

Table 5: Type 1 Mitigation Measures – Adherence to Construction Good Practice

	Small	Medium	Large
Appropriate Code of Construction Practice	See Appendix 3	See Appendix 3	See Appendix 3 / IAQM Guidance[10]
	Ensure all Non-Road Mobile Machinery NRMM comply with the requirements of the NRMM regulations.		

II. Electric Vehicle Charging Infrastructure

Electric or hybrid-electric powered vehicles currently form a small percentage of the total number of vehicles on the road. However, electric/hybrid vehicles will become more popular, further advances in technology are anticipated, and the likelihood is that these vehicles will become less expensive. Together with future development of Government policy in this area[11], it is possible that a significant percentage of vehicles will be electric or part electric powered in the near future.

A key theme of the NPFF is that developments should enable future occupiers to make green vehicle choices and it explicitly states that low emission vehicle infrastructure, including electric vehicle (EV) re-charging, should be provided. This guidance seeks to develop consistent EV re-charging standards for new developments in the Borough.

Please refer to guidance produced by IET '*Code of Practice for EV Charging Equipment Installation'* for details of charging points and plugs specifications; for both exterior and garage situations.[12]

Residential

An external charging point shall be provided per unit (Table 6). To allow for an easy upgrade to a Mode 3 (smart charging) in the future, the charging points should be supplied with a protected independent 16 amp radial circuit complying with BS7671 or equivalent; a 32 amp power supply would be advisable to future proof the development.

With regard to flatted developments and those without dedicated parking, EV provision should be in-line with Table 6; subject to the 'payment for charging' technological solutions being available.

[10] Guidance on the assessment of dust from demolition and construction - Version 1.1. Institute of Air Quality Management (IAQM) available at http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf
[11] Office for Low Emission Vehicles https://www.gov.uk/government/organisations/office-for-low-emission-vehicles
[12] Code of Practice for Electric Vehicle Charging Equipment Installation 2nd Edition - http://www.theiet.org/resources/standards/ev-cop.cfm

Table 6: Type 1 Mitigation Measures - EV Charging

	Residential	Retail	Commercial	Industrial
Provision Rate	1 charging point per unit (house with dedicated parking)	To be agreed with the developer based on strategic need; the level of EV provision will be based upon the following:		
	1 charging point per 10 spaces (unallocated parking)**	5% of parking spaces; 10 EV points maximum (this may be phased with 2.5% provision initially and a further 2.5% by agreement) See Table 3.1a		
	To prepare for increased demand in future years, appropriate cable provision should be included in scheme design and development in agreement with the local authority.			

**this requirement will be dependent on the necessary 'payment for charging' technological solutions being available.

Table 6a: Indicative EV Charging Point Provision (Retail/Commercial/Industrial)

	Provision of EV Points	
Proposed Parking Spaces	**2.5%**	**5%**
10	1	2
20	1	2
50	1	3
100	3	5
200+	5	10

Note: Percentage numbers rounded up.

Retail, Commercial and Industrial

The Council will take a more strategic approach to EV provision installed at non-residential development. This will ensure that provision throughout the Borough is considered and proportionate to the needs and site specific characteristics, such as:

- The period of time users are likely to be present at the site
- Vehicle access to charging points
- The number of vehicles accessing the site
- The number of charging points already in the vicinity
- Existing gaps in the strategic network provision
- Other emission mitigation measures already being provided by the developer.

Where the Council requests EV charging to be installed it may be appropriate to prepare for increased demand in future years, appropriate cable provision could be included in scheme design and development in agreement with the local authority.

III. Heating and Hot Water Generating Appliances

While the main sources of air pollutants are dominated by road transport and large combustion plants; homes and the choice of heating and hot water systems do have an impact. Levels of oxides of nitrogen (NO_x) vary considerably across the UK, with levels in urban areas and close to major roads many times greater than in rural areas. Emissions from heating systems have a greater impact in areas where there is a high population density, but improved air quality benefits health in both urban and rural settings.

In September 2018 requirements regarding emissions of NOx came into force. The Ecodesign Directive has changed to include mandatory limits on NOx emissions for gas, LPG and oil fired water heaters. For gas/LPG fired products the maximum NOx emissions are 56mg/kWh and for oil-fired products 120mg/kWh.

Home Quality Mark (HQM)[13] is a voluntary and customer-focused assessment and certification scheme. It recognises new homes where performance meets best practice standards that are often significantly above that required by regulation. It defines a rigorous evidence-based, relevant and independent voluntary standard for new homes built on tried and tested processes commonly used in the UK and internationally. Chapter 17 of the HQM guidance discusses how to use heating and hot water generating appliances that have minimal impact on local air quality.

Type 2 - Mitigation Measures

The NPPF recommends that where a development scheme requires a Travel Plan then all road transport mitigation measures are included within the Plan. For medium and large development categories, Type 2 mitigation should be incorporated into scheme design where appropriate (*Preventing or Avoiding*), in addition to Type 1.

I. Cycling Infrastructure

The promotion of cycling and other methods of active travel are one of the core principles of the NPPF[3] and it is increasingly being seen as a vital part of any local authority plans to tackle congestion, improve air quality, promote physical activity and improve accessibility.

Provision for cycling is better when integrated with spatial planning of development, and with integrated planning for movement in all its forms. The guidance below covers general advice for street planning as well as some focused on cycling specifically.

'Manual for streets[14]' provides guidance that aims to reduce the impact of motor vehicles on residential streets through intelligent design which gives a high priority to the needs of pedestrians, cyclists and users of public transport. These philosophies are built on further in 'Manual for streets 2[15]' which demonstrates through guidance and case studies how they can be extended beyond residential streets to encompass both urban and rural situations.

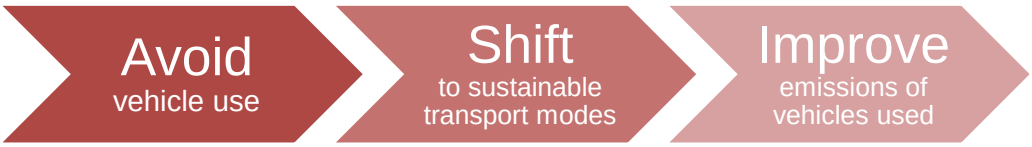
[13] Home Quality Mark – Technical Manual. SD232: 1.0. 2015 http://www.homequalitymark.com/filelibrary/HQM-Beta--England--2015_SD232_r1.0.pdf
[14] Department for Communities and Local Government - Manual for streets https://www.gov.uk/government/publications/manual-for-streets
[15] Department for Communities and Local Government - Manual for streets 2 https://www.gov.uk/government/publications/manual-for-streets-2

'Handbook for cycle-friendly design[16]' from Sustrans provides technical design guidance starting from network planning, through infrastructure features and construction design, and including management and maintenance. Whilst 'Making Space for Cycling[17]' is a guide for new development and street renewal in existing urbanised areas, prepared by Cyclenation. It covers the design principles required, from main roads down to local streets, as well as complementary measures such as cycle parking.

A list of some typical Type 2 mitigation measures are provided in the table over.

II. Travel Plan Requirements

Travel Plans should be designed to:



With respect to travel planning it is essential that;

The content of the travel plan is fully assessed prior to its approval in co-ordination with Nottinghamshire County Council transport officers. The County Council has produced a separate guidance document *Guidance for the Preparation of Travel Plans In support of Planning Applications*[18]*.*

The measures and targets included in the travel plan are secured for implementation by mutual agreement of the Borough Council and the developer/applicant (normally by means of an s106 Legal Agreement). Procedure for failure to meet objectives must form part of the agreement. The outputs of the travel plan (normally trip levels and mode split) are annually monitored against the agreed targets and objectives

The travel plan is reviewed annually to assess whether it is delivering its anticipated outputs or whether it has failed to meet its targets and if the latter what mitigation/ alternative measures need to be put in place to address the travel impact/ requirements of the scheme.

A named co-ordinator will be an essential element of any travel plan. For larger schemes a commitment in terms of staff resource allocation will be expected, this will be determined on a case by case basis in co-ordination with the Local Authority.

[16] Sustrans Design Manual Handbook for cycle-friendly design April 2014 http://www.sustrans.org.uk/sites/default/files/images/files/Route-Design-Resources/Sustrans_handbook_for_cycle-friendly_design_11_04_14.pdf

[17] Cambridge Cycling Campaign - Making Space for Cycling: A guide for new developments and street renewals http://www.makingspaceforcycling.org/MakingSpaceForCycling.pdf

[18] Nottinghamshire County Council Guidance for the Preparation of Travel Plans In support of Planning Applications September 2010 (Final Ver 1.2) Available at http://www.nottinghamshire.gov.uk/travelling/travel/plansstrategiesandtenders/travelplans/

Table 7: Examples of Type 2 Mitigation for Scheme Sustainability

Mitigation Options

Standard mitigation plus:

Residential

- Travel plan (where required) including mechanisms for discouraging high emission vehicle use and encouraging the uptake of low emission fuels and technologies
- A Welcome Pack available to all new residents online and as a booklet, containing information and incentives to encourage the use of sustainable transport modes from new occupiers
- '*Cable to property'* broadband provision to enable working from home.
- Eco-driver training and provision of eco-driver aid to all residents
- EV recharging infrastructure within the development (wall mounted or free standing in-garage or off-street points)
- Car club provision within development or support given to local car club/eV car clubs
- Designation of parking spaces for low emission vehicles
- Improved cycle paths to link cycle network
- Adequate provision of secure cycle storage
- Using green infrastructure, in particular trees to absorb dust and other pollutants

Commercial/Industrial - As above plus:

- Differential parking charges depending on vehicle emissions
- Public transport subsidy for employees
- All commercial vehicles should comply with either current or previous European Emission Standard
- Fleet operations should provide a strategy for considering reduced emissions, low emission fuels and technologies
- Use of ultra-low emission service vehicles
- Support local walking and cycling initiatives
- On-street EV recharging
- Contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development

Additional mitigation

- Contribution to low emission vehicle refuelling infrastructure
- Low emission bus service provision or waste collection services
- Bike/e-bike hire schemes
- Contribution to renewable fuel and energy generation projects
- Incentives for the take-up of low emission technologies and fuels

*For guidance on selecting the best air quality species please refer to the Urban Air Quality 2012 Woodland Trust document[19]

Note: The above list is not exhaustive and further options may be suggested where appropriate and justified, depending on the scale of development and air quality issues within the local area.

[19] Urban Air Quality, The Woodland Trust, April 2012 http://www.woodlandtrust.org.uk/en/ campaigning/our-campaigns/Documents/ urbanairqualityreport.pdf

Type 3 - Mitigation Measures

This type of mitigation is only required in the case of large scale development; in addition to Type 1 and 2 measures having been applied. In some cases the calculated value of the air quality impact may be used on projects to 'offset' the emissions from the proposal.

All large developments are required to quantify the emission impact(s) of the development on air quality and calculate this in terms of a monetary damage cost. The process for the calculation of damage costs is set out in Appendix 4. The damage cost calculation can be used to determine the level of Type 3 mitigation and/or compensation required to make the development acceptable in terms of air quality.

Development schemes may contribute to an exacerbation of air quality exceedances within an AQMA or trigger the designation of an AQMA. Planning authorities will make a decision as to whether a proposed development is an appropriate use of land and this may be influenced by the impact on air quality.

In certain circumstances it may be justifiable to recommend refusal for development if there is an unacceptable impact on air quality and appropriate mitigation measures are not feasible.

Construction Phase - Emissions Mitigation and Assessment

All development should consider the effect construction operations will have on emissions and as such mitigation should be considered (See Table 4) in all cases.

For details of the requirements for assessment and mitigation see Appendix 3.

For Large Scale developments the IAQM Guidance on the assessment of dust from demolition and construction[9] or alternatively the London Best Practice Guidance[20] should also be used to inform the choice of assessment and/or mitigation measures required during construction.

In the case of a large scale development, where an air quality assessment is required, that assessment should also include an assessment of the air quality effects of the construction phase.

Guidance published by the Institute of Air Quality Management[9] (IAQM) sets out the methodology for assessing the impacts on air quality from the construction phase of any development. (See Technical Appendix 2)

[20] The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance. Available at http://www.london.gov.uk/sites/default/files/BPGcontrolofdustandemissions.pdf

Scheme Mitigation Statement

Each development requires a brief mitigation statement; outlining the measures proposed (Type 1-3) depending on development scale.

This would also include the mitigation measures suggested from the assessment of dust from demolition and construction to minimise emissions to atmosphere during the construction phase (see Appendix 3).

In addition, in the case of large developments, the statement should include an assessment of impacts and mitigation measures associated with the construction phase, as assessed as part of the wider development's detailed air quality assessment (see Appendix 2).

Technical Appendix 1

Air Pollution and Health

Air pollution

Different sources of pollution, including transport and non-transport sources, emit different types and ratios of pollutants. Whilst the extent to which the population and environment are exposed to harmful levels of air pollution is a complex issue, dependent on how pollutants travel in the atmosphere, their mixing and how they react under different meteorological conditions, Figure 3 shows how it can be conceptualised by a simple **Source** (emission source), **Pathway** (air, inhalation) **Receptor** (people, environment) model. Road transport emissions are relatively more impactful than those from other sources, as most emissions tend to occur in areas where people live and work, such as cities and towns.

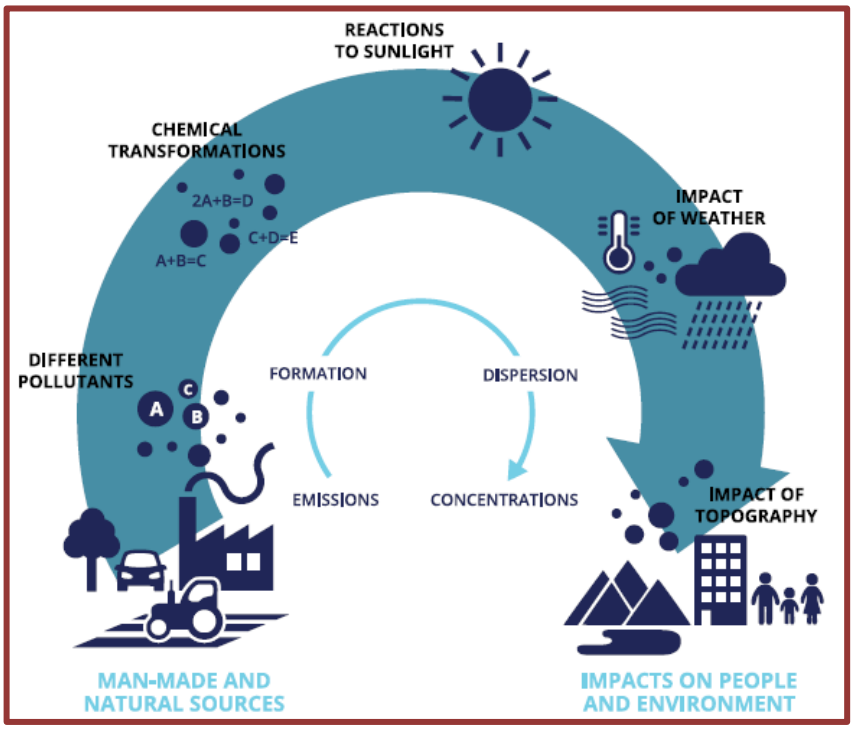


Figure 3: Air pollution: from emissions to exposure[21]

Air pollution is the largest contributor to the burden of disease from the environment that can impact on the whole population. Current evidence indicates that air pollution is associated with cardiovascular disease, lung cancer, respiratory disease, asthma and stroke. Air pollution disproportionately affects the young, older people, those with underlying cardiopulmonary conditions and the most deprived within our communities.

Risks are mainly related to long-term exposure to particulate air pollution ($PM_{2.5}$) and nitrogen dioxide (NO_2). Nitrogen dioxide (NO_2) is produced with nitric oxide (NO) during the combustion of fossil fuels. Together they are often referred to as oxides of nitrogen (NO_x). The evidence associating NO_2 with health effects has strengthened substantially in recent years.

There is increasing evidence that links long-term exposure to NO_2 to mortality, although it is possible that, to some extent, NO_2 acts as a marker of the effects of other traffic-related pollutants[22].

[21] European Environment Agency -Air pollution: from emissions to exposure - https://www.eea.europa.eu/media/infographics/air-pollution-from-emissions-to-exposure/view

Particulate matter (PM) is an air pollutant which contains a mixture of microscopic solid and liquid particles suspended in air. It is made of various physical and chemical components such as nitrates, sulphates, ammonium and other inorganic ions; organic and elemental carbon; polycyclic aromatic hydrocarbons (PAHs); metals such as copper, zinc and nickel; dust, soil and smoke. Biological components such as allergens and microbial compounds are also found in PM[23]. The commonly used definition of PM refers to the mass concentration of particles with a specified diameter. PM with a diameter of 10µm or less referred to as PM10 and particles with a diameter 2.5µm or less are referred to as PM2.5. PM also includes ultrafine particles which have a diameter of less than 0.1µm.

Similarly, there will be a health burden from short-term exposure to some air pollutants (e.g. ozone) although this impact is likely to be less[24]. Other pollutants of less concern, in terms of their typical concentration in the air that we breathe, include benzene (C6H6), sulphur dioxide (SO2), carbon monoxide (CO), lead (Pb) and 1,3-butadiene.

The financial implications arising from the health burden associated with air pollution are considerable. DEFRA have estimated the annual health costs for UK citizens to be in the region of £15 billion (range: £8-17 billion). As a comparison the health costs arising from obesity have been estimated to be around £10 billion per year[25] . There is, however, relatively low public awareness of air quality as an issue, making air pollution an invisible public health problem that affects much of the UK.

Actions that improve local air quality can deliver public health benefits across entire local authority areas. There are no thresholds of effect identified for nitrogen dioxide and particulate matter and therefore health benefits can be expected from improving air quality even below concentrations stipulated by air quality standards[26].This means that action to improve air quality is not just about dealing with areas where there are exceedances of air quality standards.

There is growing evidence that tackling air pollution can be a key element of growth and regeneration policies. Town centres can benefit in many different ways from measures that reduce air pollution potentially including reduction of noise pollution and surface temperature, increased amenity value, and improved aesthetic appearance. Further to this these measures improve health outcomes and reduce health inequalities in a cost-effective way that promotes healthy and active lifestyles, therefore leading to social and economic benefits. Spatial planning has an important role to play in improving air quality and reducing people's exposure to air pollution.

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[22] Committee on the Medical Effects of Air Pollutants (COMEAP) - Statement on the evidence for the effects of nitrogen dioxide on health. Available at https://www.gov.uk/government/publications/nitrogen-dioxide-health-effects-of-exposure

[23] World Health Organisation (WHO) - Health Effects of Particulate Matter. Available at http://www.euro.who.int/__data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf

[24] Committee on the Medical Effects of Air Pollutants (COMEAP) - Long-term exposure to air pollution: effect on mortality (final report - June 2009). Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/304667/COMEAP_long_term_exposure_to_air_pollution.pdf

[25] Department for Environment, Food and Rural Affairs - Air Pollution: Action in a Changing Climate (2010). Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69340/pb13378-air-pollution.pdf [Accessed 26/07/16].

[26] World Health Organization (WHO) Regional Office for Europe. Review of evidence on health aspects of air pollution - REVIHAAP Project: Final technical report2013 15/10/14. Available from: http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/publications/2013/review-of-evidence-on-health-aspects-of-air-pollution-revihaap-project-final-technical-report

New urban developments can be designed to improve local air quality and the health of the local population by considering the placement of transport and industrial infrastructure, better street design to encourage community cohesion and better use of innovative building design.

Air Pollution and Public Health

In the UK, the mortality burden of exposure to human-made air pollution is estimated as an annual effect equivalent to between 28,000 and 36,000 deaths a year, with an associated loss of life of between 328,000 and 416,000 years[1]. For the East Midlands it has been estimated as an annual effect equivalent to 2,314 deaths, with an associated loss of life of 24,016 life-years attributable to particulate air pollution only[2].

Public Health England publishes an annual indicator in the Public Health Outcome Framework relating to air quality[7]. The indicator is a summary measure of the impact on death rates of long term exposure to man-made particulate air pollution. The indicator underlines the scale of the health impact and the fact that it is modifiable.

PHE have estimated the mortality burden are based on modelled annual average concentrations of fine particulate matter (PM2.5) in each local authority area originating from human activities, based on the attributable mortality in 2010[1]. These estimates are useful when assessing local public health priorities, as well as to those working in the field of air quality and public health. The data for the East Midlands can be found on page 5 of the report.

There are a range of evidence-based and achievable actions which improve air quality and health outcomes[27]. Action can be taken at a number of levels and, in some cases, air quality initiatives significantly complement programmes to increase physical activity, decrease obesity and improve cardiovascular and respiratory health.

For example:

- Nearly 80 per cent of car trips under five miles could be replaced by walking, cycling or using public transport[28];
- Active travel can be promoted by local authorities and major local employers[27];
- Street environments can prioritise place over cars and increase perceptions of safety, quality of life and 'walkability'[27];
- Susceptible individuals (the elderly, those with existing heart disease and respiratory disease) can be informed of the risks of air pollution, and helped to take avoiding action using air pollution forecasts[29];
- 'Eco-driving' training can be organised for taxi-drivers to encourage more fuel-efficient driving, and reduce idling at taxi ranks[30];

[27] The Kings Fund - Improving the public's health: A resource for local authorities. Available at https://www.kingsfund.org.uk/sites/files/kf/field/field_publication_file/improving-the-publics-health-kingsfund-dec13.pdf

[28] Cabinet Office Strategy Unit, An Analysis of Urban Transport. 2009. Available at http://webarchive.nationalarchives.gov.uk/+/http:/www.cabinetoffice.gov.uk/media/308292/urbantransportanalysis.pdf [accessed 28/07/16]

[29] Brook, R.D. et al. Particulate Matter Air Pollution and Cardiovascular Disease : An Update to the Scientific Statement From the American Heart Association, Journal of the American Heart Association, Circulation 2010, 121:2331-2378.

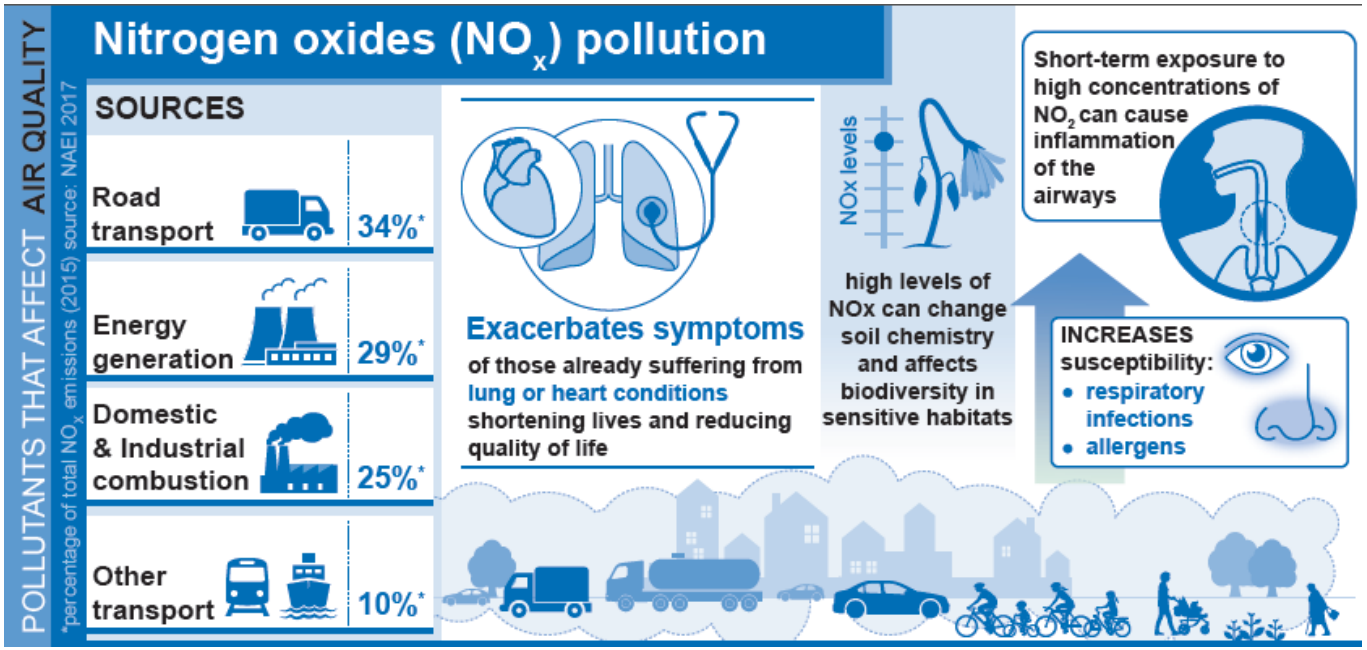
[30] Kilbane-Dawe, I. 14 Cost Effective Actions to Cut Central London Air Pollution, Par Hill Research Ltd. Science, Environment and Policy Research. Available at http://www.rbkc.gov.uk/pdf/air_quality_cost_effective_actions_full_report.pdf, accessed 02.05.2014

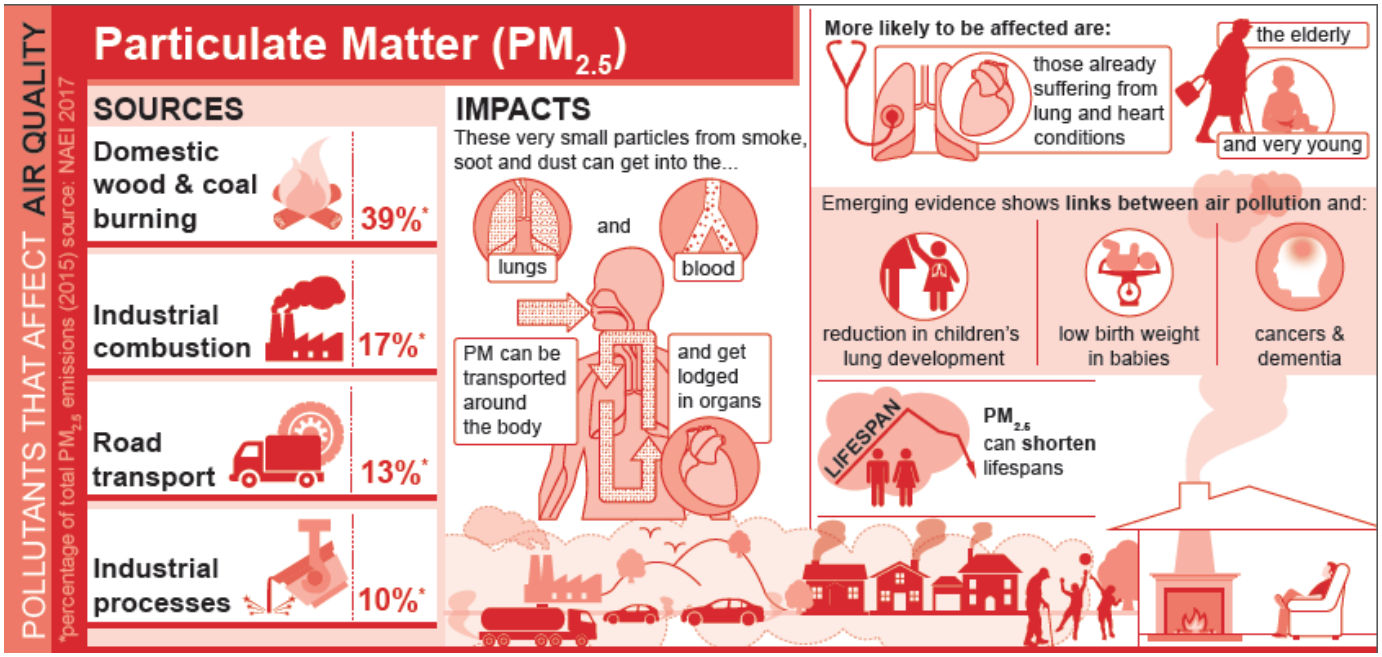
- Boilers can be replaced with the least polluting models[30];
- New buildings can be made "air quality neutral"[30]; and
- Local authority powers can be used to regulate types of traffic and traffic flows to ensure that they are fully contributing to public health strategies and goals[27].

Prioritising action in this way delivers benefits across the agendas of local authorities and clinical commissioners, and benefits the following public health outcomes (expressed as Public Health and NHS Outcome indicators).

Table A1.1: Public Health Outcome Framework indicators which can be positively affected by air quality interventions[7]

1.10 (PHOF)	Rate of people killed and seriously injured on the roads, all ages, per 100,000 resident population
1.16 (PHOF)	Percentage of people using outdoor space for exercise/health reasons
2.06i (PHOF)	Percentage of children aged 4-5 classified as overweight or obese
2.06ii(PHOF)	Percentage of children aged 10-11 classified as overweight or obese
2.12 (PHOF)	Percentage of adults classified as overweight or obese
2.13i (PHOF)	Percentage of adults achieving at least 150 minutes of physical activity per week in accordance with UK CMO recommended guidelines on physical activity
3.01 (PHOF)	**Fraction of all-cause adult mortality attributable to longterm exposure to current levels of anthropogenic particulate air pollution**
3.06 (PHOF)	Percentage of NHS organisations with a board approved sustainable development management plan
4.04i (PHOF)	Age-standardised rate of mortality from all cardiovascular diseases (including heart disease and stroke) in persons less than 75 years of age per 100,000 population
4.07i (PHOF)	Age-standardised rate of mortality from respiratory disease in persons less than 75 years per 100,000 population
2.3i and 2.3ii (NHS OF)	Reducing time spent in hospital by people with long-term conditions i Unplanned hospitalisation for chronic ambulatory care sensitive conditions (adults) ii Unplanned hospitalisation for asthma, diabetes and epilepsy in under 19s


POLLUTANTS THAT AFFECT AIR QUALITY
*percentage of total NOx emissions (2015) source: NAEI 2017
Nitrogen oxides (NOx) pollution
SOURCES
Road transport 34%*
Energy generation 29%*
Domestic & Industrial combustion 25%*
Other transport 10%*
Exacerbates symptoms
of those already suffering from lung or heart conditions shortening lives and reducing quality of life
NOx levels
high levels of NOx can change soil chemistry and affects biodiversity in sensitive habitats
Short-term exposure to high concentrations of NO2 can cause inflammation of the airways
INCREASES susceptibility:
• respiratory infections
• allergens


POLLUTANTS THAT AFFECT AIR QUALITY
*percentage of total PM2.5 emissions (2015) source: NAEI 2017
Particulate Matter (PM2.5)
SOURCES
Domestic wood & coal burning 39%*
Industrial combustion 17%*
Road transport 13%*
Industrial processes 10%*
IMPACTS
These very small particles from smoke, soot and dust can get into the...
lungs
and
blood
PM can be transported around the body
and get lodged in organs
More likely to be affected are:
those already suffering from lung and heart conditions
the elderly
and very young
Emerging evidence shows links between air pollution and:
reduction in children's lung development
low birth weight in babies
cancers & dementia
LIFESPAN
PM2.5 can shorten lifespans

Air Pollution and Climate Change

The burning of fossil fuels (such as petrol and diesel) is a primary source of both oxides of nitrogen (NO_x) and carbon dioxide (CO_2). Action on air pollution can co-benefit climate change mitigation and vice versa.

The Council's *Sustainability Strategy and Action Plan* is seen as fundamental in taking forward the Council's objective, set out in the 2012/13 Council Plan, to *"reduce the Council's and the Borough's carbon footprint and energy usage"*.

Amongst the strategy's aims are to:

- Reduce the overall carbon emissions of the Borough.
- Continually improve the energy efficiency and performance of the Council's own estate and wider community.
- Promote a shift to a more sustainable mode of public and private transport system.
- Promote behavioural change towards more sustainable ways of living among staff and members of the public and enabling community resilience to a changing climate.
- Accelerate the shift towards a low carbon economy and facilitate the creation of "green" jobs.

Many of the measures promoted within this document can help to achieve the above carbon reduction aims.

Technical Appendix 2

Air Quality Assessments

Introduction

The purpose of an air quality assessment is to determine the predicted impact of a development on local air quality, public health and/or the local environment, to help determine the appropriate level of mitigation from a development. The assessment should be carried out by a developer's air quality consultant.

Air Quality Assessment Process

The Borough Council has used similar assessment methods to fulfil the requirements of its detailed Review and Assessment that led to the Air Quality Management Area (AQMA) designation. For consistency, air quality assessments for developments should, where possible, follow similar methodologies.

Local authorities will work with developers by providing guidance on the suitability of such measures, which should be incorporated at the early design stage of any proposal.

Guidance on the methodologies to be used for air quality assessments is also available in the DEFRA's Technical Guidance Note[9], and other guidance available from the DEFRA and IAQM webpages[31].

Key Components of an Air Quality Assessment

The assessment will require dispersion modelling utilising agreed monitoring data, traffic data and meteorological data. The modelling should be undertaken using recognised, verified local scale models by technically competent personnel and in accordance with LAQM TG16[9]. The study will comprise:

1. The assessment of the existing air quality in the study area for the baseline year with agreed receptor points and validation of any dispersion model;

2. The prediction of future air quality without the development in place (future baseline or do-nothing);

3. The prediction of future road transport emissions and air quality with the development in place (with development or do-something).

4. The prediction of future road transport emissions and air quality with the development (with development or do-something) and with identified mitigation measures in place.

5. Sensitivity test allowing for no improvement in traffic and background emissions.

[31] Environmental Protection UK and the Institute of Air Quality Management - Land-Use Planning & Development Control: Planning For Air Quality (January 2017). Available at http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

The assessment report should include the following details:

A. Detailed description of the proposed development, including:

- Identify any on-site sources of pollutants;
- Overview of the expected traffic changes;
- The sensitivity of the area in terms of objective concentrations;
- Local receptors likely to be exposed; and
- Pollutants to be considered and those scoped out of the process.

B. The relevant planning and other policy context for the assessment.

C. Description of the relevant air quality standards and objectives.

D. The basis for determining significance of effects arising from the impacts.

E. The assessment method details including model, input data and assumptions:

For traffic assessment;

- Traffic data used for the assessment;
- Emission data source;
- Meteorological data source and representation of area;
- Baseline pollutant concentration including any monitoring undertaken;
- Background pollutant concentration;
- Choice of base year;
- Basis for NOx:NO_2 calculations;
- A modelling sensitivity test for future emissions with and without reductions;

For point source assessments:

- Type of plant;
- Source of emission data and emission assumptions;
- Stack parameters – height, diameter, emission velocity and exit temperature;
- Meteorological data source and representation of area;
- Baseline pollutant concentrations;
- Background pollutant concentrations;
- Choice of baseline year;
- Basis for deriving NO_2 from NOx.

F. Model verification for all traffic modelling following DEFRA guidance[9]:

G. Identification of sensitive locations:

H. Description of baseline conditions:

I. Assessment of impacts:

- Comparisons between results of modelling the ‘with development’ scenario and ‘no development’ conditions;
- Descriptions of the impacts at the individual receptors should be provided;
- Comment on the sensitivity of the results to input choices

J. Description of demolition/construction phase impacts:

K. Cumulative impacts and effects:

L. Mitigation measures:

M. Summary of the assessment results:
- 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 PM2.5);
- Impacts of existing sources on new receptors, particularly where new receptors are being introduced into an area of high pollution;
- Any exceedances 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.

Air Quality Monitoring

In some case it will be appropriate to carry out a short period of air quality monitoring as part of the assessment work. This will help where new exposure is proposed in a location with complex road layout and/or topography, which will be difficult to model or where no data is available to verify the model. Monitoring should be undertaken for a minimum of six months using agreed techniques and locations with any adjustments made following Defra technical guidance[9].

Assessment of the Air Quality Impacts of Construction

See Appendix 3.

Technical Appendix 3

Demolition and Construction Dust Management Guidance

Introduction

Dust[1] arising from development is additional to background dust concentrations. If not adequately controlled dust emissions from developments will lead to increases in dust concentrations beyond the site boundary, which may affect local amenity and influence local air quality.

It is more effective to address dust emissions at the design and planning stage of new development proposals, than to seek to deal with dust problems retrospectively. Likewise it is more effective to deal with potential dust emissions at source, rather than once airborne.

The level of dust impact is dependent on:

- The scale of any proposal;
- The nature of the proposal;
- The location and sensitivity of receptors;
- The existing dust conditions at the location;
- Local weather patterns;
- Topography.

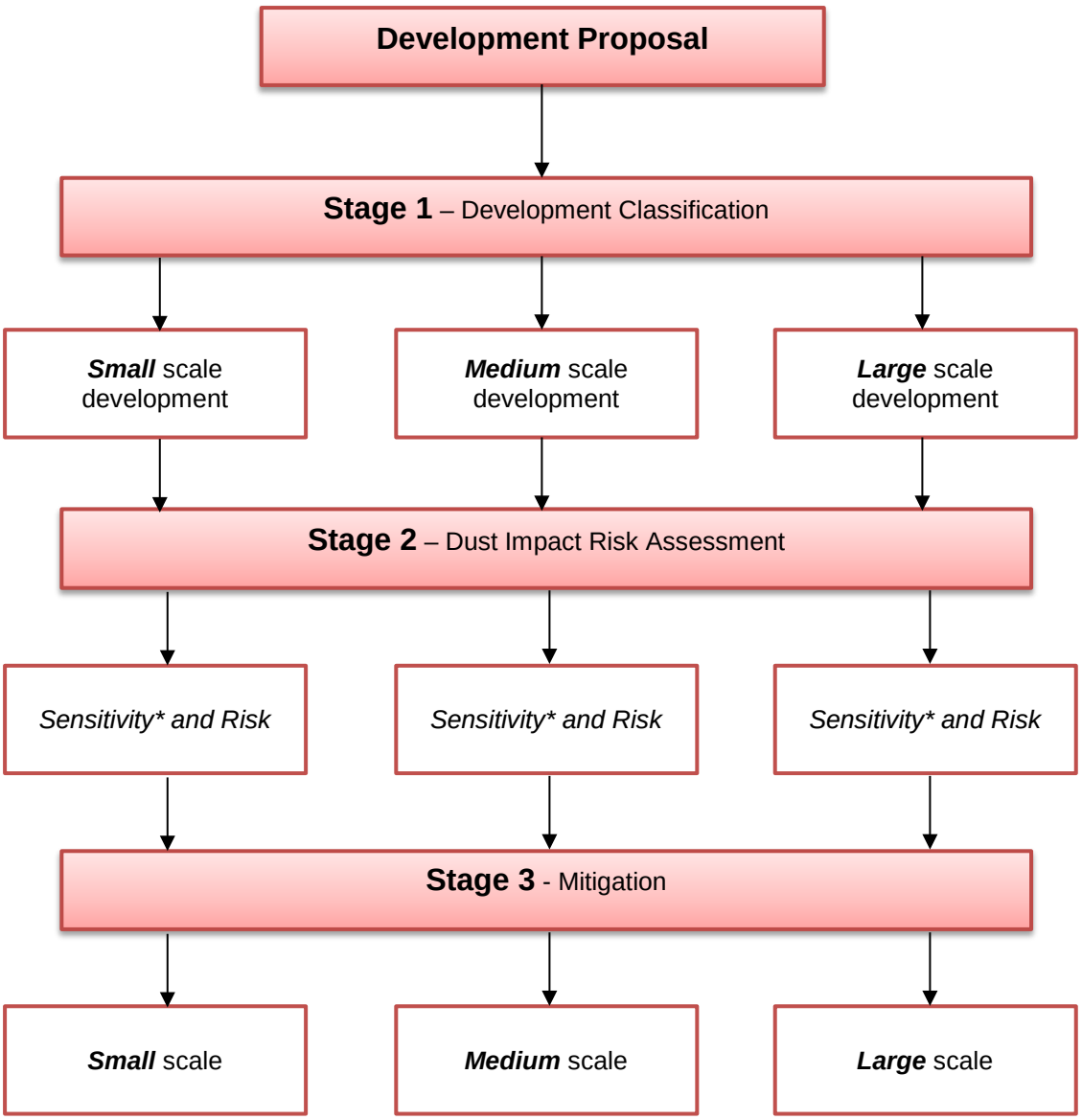
The requirement in most dust related planning conditions for the need to submit a "scheme" or "plan" that is acceptable does not provide sufficient information for the developer to undertake an effective assessment of the likely impact of the proposal, or know what appropriate mitigation measures are required. This leads to further time consuming negotiations that benefits no-one. This short guidance is provided in order to reduce the time taken by all parties and provides a clear understanding of what is required and how it is to be achieved.

Minerals and quarries are specifically identified through the National Planning Policy Framework and National Planning Practice guidance and are not covered by this note.

The level of impact and mitigation information required within this framework is achieved through the process illustrated in the flow chart overleaf.

[1] 'Dust' in this guidance refers to particles that give rise to soiling, to human health and ecological effects.

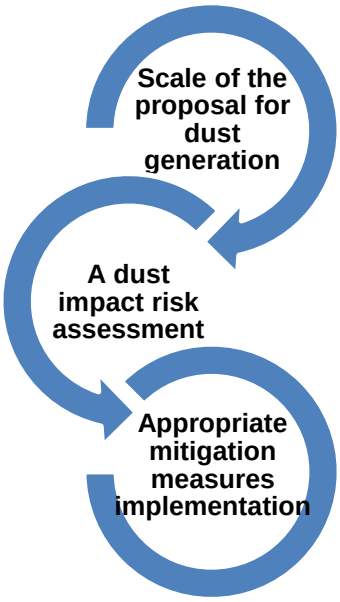
The Dust Management Assessment and Mitigation Flow Chart



*There is no safe level for exposure to fine particulate pollution. However, all applications must ensure as a minimum a proposal does not expose existing or future residents to levels of pollutants above the Air Quality Objectives.

Assessment and Mitigation

A three stage process is described to provide sufficient information to enable the identification of appropriate mitigation measures to ensure the minimisation of dust impact on local receptors and air quality. The stages are:



The five site activities are recognised as potential for dust generation:

- Demolition;
- Earthworks;
- Construction;
- Track out (off-site vehicle movements);
- Non-road Mobile Machinery (NRMM).

NRMM Requirements

NRMM refers to machinery that is: not intended for carrying passengers or goods on the road and installed with a combustion engine (either spark ignition or compression ignition). Examples on construction/demolition activities include (but not limited to): generators, bulldozers, pumps, construction machinery, mobile cranes, fork lifts, industrial trucks.

NRMM emissions are regulated by European Directive (EU 97/68/EC) as amended and enforced through the Road Mobile Machinery (Emission of Gaseous and Particulate Pollutants) Regulation 1999 as amended. A tightening of emissions is required through a progressive staged implementation (Stages 1 – V) by 2020.

NRMM Control
The NRMM standards apply to machinery of net power between 37kW and 560kW of variable and constant speed engines for NOx and Particulate Matter. These are:

- Sites classified as MEDIUM development are required to meet Stage IIA of the Directive as a minimum;
- Sites classified as LARGE will meet Stage IIB.

From 2020:

- Any construction/demolition site using NRMM will meet Stage IIB of the Directive, and;
- MEDIUM and MAJOR classified sites will meet Stage IV.

This is achievable by: re-organisation of NRMM equipment; replacement of non-compliant equipment; retrofit abatement technologies to non-compliant equipment; engine replacement. Exemption will only be allowed if: no compliant machinery is available or comprehensive retrofit is not feasible.

Stage 1 – Scale of Proposal

The size of any proposal will determine the level of potential dust emission. Using the site activities, the table below classifies the scale of a proposal as Small, Medium and Large.

Activity	Criteria	Scale
Demolition	<20,000m^3 total volume of structure working at <10m above ground.	Small
	20,000m^3-50,000m^3 total volume of structure working at 10m-20m above ground.	Medium
	>50,000m^3 total volume of structure working >20m above ground.	Large
Earthworks	<2,500m^2 total site area using <5 heavy moving vehicles.	Small
	2,500m^2-10,000m^2 total site area, 5-10 heavy moving vehicles.	Medium
	>10,000m^2 total site area >10 heavy moving vehicles.	Large
Construction	<25,000m^3 construction material. <10 dwellings.	Small
	25,000m^3-100,000m^3 construction material. 10-50 dwellings.	Medium
	>100,000m^3 construction material. >50 dwellings.	Large
Trackout	<10 HDV (>3.5t) outward movements off-site in any one day.	Small
	10-50 HDV (>3.5t) outward movements in any one day.	Medium
	>50 HDV (>3.5t) outward movements in any one day.	Large

Whichever is the largest will be the overall scale.

Stage 2 - Dust Impact Risk Assessment

The potential risk of dust impacting on receptors requires assessing to enable to gauge the level of required mitigation. The level of dust impact is associated with:

- The number, location and sensitivity of receptors;
- The type, location and frequency of site activity;
- The scale of the development.

Further information and reference is available at the Institute of Air Quality Management (IAQM) Guidance and the Mayor of London Control of Dust Supplementary Planning Guidance London Guidance.

Small and Medium Risk Assessment

The number and degree of sensitive receptors in proximity to the proposal works are used to determine the level of risk.

Sensitive Receptors for SMALL and MEDIUM Proposals

High Sensitivity	Medium Sensitivity	Low Sensitivity
Hospitals and clinics	Schools	Farms
Hi-Tech industries	Residential Areas	Light & Heavy Industry
Painting & furnishing	Food Retailers	Outdoor Storage
Food Processing	Greenhouses & Nurseries	
	Horticultural Land	
	Offices	

Assessment of the dust impact risk for SMALL and MEDIUM proposals:

Sensitive Receptors	Number of Total Receptors	Distance from Source (m)		
		<20	<50	<100
High	>50	Large	Large	Medium
	10-50	Large	Medium	Small
	1-10	Medium	Small	Small
Medium	>1	Medium	Small	Small
Low	>1	Small	Small	Small

The highest outcome will be the overall level of risk Assessment of the dust impact risk for designated **LARGE** proposals should follow the IAQM Guidance

Stage 3 - Mitigation Measures

The outcome of the scaling and risk assessment will identify the level of likely impact on the local amenity and air quality and the required level of mitigation. The mitigation is listed in any dust management plan or dust minimisation scheme together with responsibility for each measure implementation and control.

The Met Office now offer a specific construction site weather report to enable a more effective site environmental management programme Met Office Construction Site Weather Reports

REQUIRED MITIGATION MEASURES

Measure	Scale and Risk		
	Small	Medium	Large
Develop and implement a stakeholder communications plan that includes community engagement before work commences on-site.		✓	✓
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	✓	✓	✓
Display the head or regional office contact information		✓	✓
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Make the log available to LPA if required.		✓	✓
Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.		✓	✓
Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.			✓
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.		✓	✓
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.		✓	✓
Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.			✓
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	✓	✓	✓
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.		✓	✓
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period		✓	✓
Avoid site runoff of water or mud.	✓	✓	✓
Keep site fencing, barriers and scaffolding clean using wet methods.	✓	✓	✓
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re- used on-site cover as described below.	✓	✓	✓
Cover, seed or fence stockpiles to prevent wind whipping.		✓	✓
Ensure all NRMM meet the required emission standards.		✓	✓
Ensure all vehicles switch off engines when stationary - no idling vehicles.	✓	✓	✓
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	✓	✓	✓
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).			✓
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	✓	✓	✓

Measure	Scale and Risk		
	Small	Medium	Large
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	✓	✓	✓
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	✓	✓	✓
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	✓	✓	✓
Avoid bonfires and burning of waste materials.	✓	✓	✓
DEMOLITION SPECIFIC			
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	✓	✓	✓
Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	✓	✓	✓
Avoid explosive blasting, using appropriate manual or mechanical alternatives.		✓	✓
Bag and remove any biological debris or damp down such material before demolition.	✓	✓	✓
EARTHWORKS SPECIFIC			
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.			✓
Only remove the cover in small areas during work and not all at once			✓
CONSTRUCTION SPECIFIC			
All contractors and sub-contractors to be made aware of and sign-up to the dust management scheme.	✓	✓	✓
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.		✓	✓
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.		✓	✓
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.		✓	✓
TRACKOUT SPECIFIC			
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.		✓	✓
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	✓	✓	✓
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.		✓	✓
Record all inspections of haul routes and any subsequent action in a site log book.		✓	✓
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.		✓	✓
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).		✓	✓
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.			✓

Technical Appendix 4

Valuing Impacts on Air Quality for Type 3 Mitigation Measures

Emissions Assessment and Mitigation Calculation

For development schemes that have the potential for major detrimental impact on air quality, this guidance specifies an assessment procedure to evaluate the likely change in relevant concentrations and emissions arising from the scheme using the guidance produced by HM Treasury and DEFRA.

Two approaches are used to value changes in air quality, dependent on the nature of the change. They are:

- the ***impact pathway approach***, which is used in the majority of instances to value the consequences of changes in air quality such as on health, crops and buildings; and
- the ***abatement cost approach***, which is used in the limited instances where the change in air quality is likely to affect compliance with a legally binding obligation (whether causing, removing or changing the extent of non-compliance).

Chart 1.A (over) illustrates how to identify the appropriate approach.

The *abatement cost approach*[32] is relevant for the minority of situations where the breach of legally binding obligations is an issue. In such instances, it is still only those changes in air quality in excess of the relevant obligation that should be valued using this approach. Changes below the obligation should be valued using the *impact pathway approach*.

The *impact pathway approach* (I-PA) is the central methodology for appraisal. It values the air quality impacts of proposed decisions by estimating how changes in the ambient concentrations of air pollutants affect a range of health and environmental outcomes.

Full I-PA modelling is therefore quite resource and time intensive, requiring the estimation of emissions, dispersion, population exposure and outcomes. ***Damage costs*** have been developed to enable proportionate analysis when assessing the scale of air quality impacts where they are less significant. They are derived from the I-PA methodology to offer approximations of the value using representative modelling. The full I-PA uses bespoke analysis to provide a fuller assessment, suitable for cases where air quality impacts are significant. (See Appendix 2 Air Quality Assessment).

When total air quality impacts are estimated to be <u>less than</u> £50 million (in present value terms) it is recommended that *Damage Costs* are used. Where total air quality impacts are estimated to be in excess of £50 million a full *impact pathway assessment* should be considered in consultation with Defra.

It is considered that the damage cost approach will be sufficient in the majority of cases; thus the remaining of this Appendix will concentrate on this method of impact assessment.

[32] http://www.gov.uk/air-quality-economic-analysis

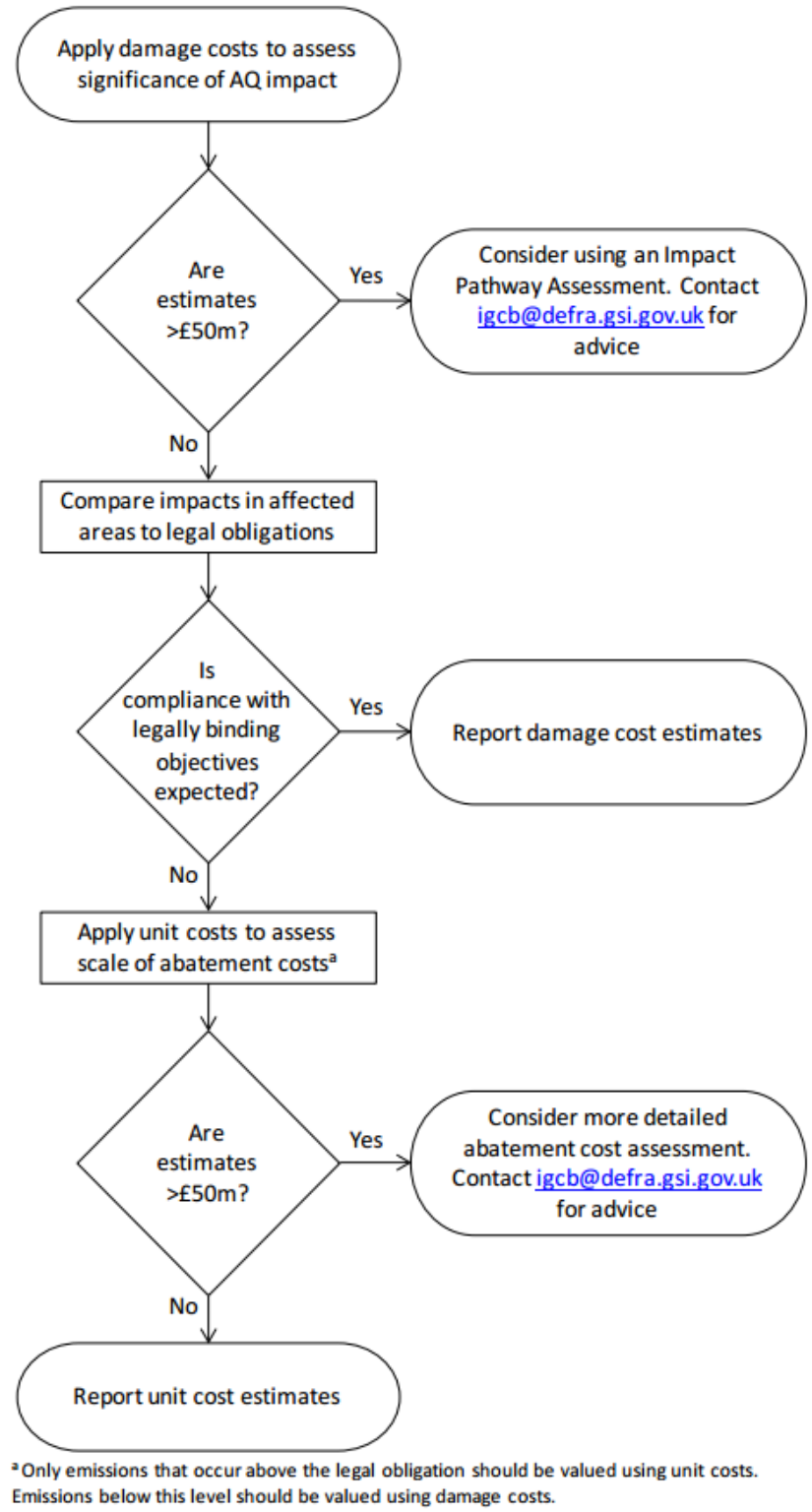


Figure 4: Overview of air quality valuation methodologies[33]

[33] HM Treasury and Department for Environment, Food and Rural Affairs (DEFRA)-.*Valuing impacts on air quality: Supplementary Green Book guidance* (May 2013) Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/197893/pu1500-air-quality-greenbook-supp2013.pdf

Damage Costs Calculation

As part of the assessment procedure a simple calculation is proposed to allow the quantification of any emission changes – the pollution impact of a scheme can then be monetised using the pollutant damage costs (per tonne) specified by the Defra Inter-Governmental Department on Costs and Benefits (IGCB)[34].

Taking into account Type 1 and 2 Mitigation Measures built into the scheme

The emissions calculator or toolkit (below) provides a basic emission calculation; however the proposal should already include some mitigation measures e.g. alternative fuels or technology (LPG, EV etc.), and these need to be taken into account during the damage costs calculation. The "advanced options" within the toolkit can accommodate inputs for alternative fuels.

Calculating Emissions

The emissions calculator provides a calculation to determine the amount of pollutant emissions a development is likely to produce. This in turn, by multiplying the damage cost for the key pollutants (PM_{10} and NOx see below), determines the amount (value) of mitigation that is expected to be spent on measures to mitigation those impacts.

Road Transport Emission Increase =

$\sum$ [Estimate trip rate X Emission rate per 10km* per vehicle type X Damage costs]

The calculation uses the most current DEFRA Emissions Factor Toolkit[35] (EFT) to estimate the additional pollutant emissions from a proposed development. This will provide the relevant pollutant emissions outputs for the mitigation calculation, which is then multiplied to provide an exposure cost value.

The road transport emission increase should be calculated in accordance with Defra guidance up to a maximum of 5 years; a trip length of 10km should be used[36,37]

Damage costs per tonne of air quality pollutants were updated by Defra in 2015 and are periodically reviewed to reflect the latest evidence. Current damage cost figures per tonne should be used when carrying out air quality economic appraisals.

Information on techniques and approaches to be used for damage cost calculation can be found at: https://www.gov.uk/guidance/air-quality-economic-analysis

Recent updates relating to emissions of Oxides of Nitrogen (NOx) and concentrations of Nitrogen Dioxide (NO_2) can be found at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/460401/air-quality-econanalysis-nitrogen-interim-guidance.pdf

[34] Department for Environment, Food and Rural Affairs (DEFRA)- Air quality: economic analysis. Available at https://www.gov.uk/air-quality-economic-analysis
[35] DEFRA Emissions Factor Toolkit: http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html
[36] Trip rates can be sourced from transport assessment or local authority/transport authority.
[37] Trip length uses the National Travel Survey:2011 - UK average = 7.1miles/10km https://www.gov.uk/government/collections/national-travel-survey-statistics

Type 3 Mitigation/Compensation Measures

By establishing the damage costs arising from development scheme emission changes it is possible to assess any additional mitigation or compensation that is required to make the scheme acceptable. A suite of mitigation/compensation measures termed Type 3 mitigation is shown in the table below:

Table A3.1: Examples of Type 3 Additional Mitigation and/or Compensation Required for Scheme Acceptability

Mitigation/ Compensation Options	• On-street EV recharging. • Contribution to low emission vehicle refuelling infrastructure. • Car clubs. • Low emission bus service provision. • Low emission waste collection services. • Bike/e-bike hire schemes. • Bike infrastructure. • Contribution to renewable fuel and energy generation projects. • Incentives for the take-up of low emission vehicle technologies and fuels. • Air Quality Monitoring programmes. • Other sustainable transport provision as appropriate to the development. • Contribution towards other public transport improvements.

Note: Where Type 3 mitigation is required, the planning authority and developer will agree measures that are appropriate and in scale and kind to the development. Such measures may be taken forward by condition, where possible, or through the use of a Section 106 Agreement.

The planning authority will need to take into account of any Type 3 mitigation measures that are included on a Community Infrastructure Levy (CIL) list.

The list in Table A3.1 is not exhaustive and further options may be suggested where authorities feel it is appropriate, depending on the scale of development and air quality issues within an area.

The mitigation options selected for a development should be relevant and appropriate to:

- Any local policies including Air Quality Action Plans, which may determine the mitigation priorities for a scheme that the local authority may wish to see, be incorporated within a particular scheme.

- Any local air quality concerns; to assist in the remediation of potential cumulative air pollution impacts of the development on the local community.

- The type, size and activity of the development.