

Warwick District Council

# AIR QUALITY & PLANNING SUPPLEMENTARY PLANNING DOCUMENT

January 2019



Aims to assist in reducing air quality impacts of development.

This guidance has been developed in co-operation between Coventry City Council, Coventry & Warwickshire Public Health, Nuneaton and Bedworth Borough Council, Rugby Borough Council, Stratford District Council and Warwick District Council.

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# Glossary

|  |   |
|--|---|
| <b>AADT</b>                                  | Annual average daily traffic flows  |
| <b>AIR QUALITY ASSESSMENT (AQA)</b>          | An assessment of the impact of a development on the levels of certain pollutants in the local area and the impact of pollution levels on future occupants   |
| <b>AIR QUALITY MANAGEMENT AREAS (AQMAS)</b>  | Areas where the air quality objectives are likely to be exceeded. Declared by way of an order issued under the Section 83(1) of the Environment Act 1995  |
| <b>AIR QUALITY OBJECTIVES</b>                | Air quality targets to be achieved locally as set out in the Air Quality Regulations 2000 and subsequent Regulations. Objectives are expressed as pollution concentrations over certain exposure periods, which should be achieved by a specific target date. Some objectives are based on long term exposure (e.g. annual averages), with some based on short term objectives. Objectives only apply where a member of the public may be exposed to pollution over the relevant averaging time |
| <b>CLEAN AIR ZONES (CAZ)</b>                 | Zone implemented by a local authority setting nationally set emission standards for vehicles. Non-charging zones can be implemented through policies covering bus and taxi emissions. Charging zones require non-compliant lorries and possibly vans to pay a charge to enter the zone  |
| <b>DAMAGE COSTS</b>                          | Damage costs are a simple way to value changes in air pollution. They estimate the cost to society of a change in emissions of different pollutants   |
| <b>ENVIRONMENTAL IMPACT ASSESSMENT (EIA)</b> | Assessment required for projects specified in Environmental Impact Assessment Directive. Governed by the Town & Country Planning (Environmental Impact Assessment) Regulations 2017   |
| <b>EU LIMIT VALUE</b>                        | Legally binding pollutant concentration limit on Governments of EU Countries  |
| <b>EURO STANDARDS</b>                        | European Emission Standard (progressively tightened emission standards for vehicles. Euro Standards for cars and small vans are stated in Hindu-Arabic numbers and HDVs in Roman numerals)  |
| <b>EXCEEDENCE</b>                            | Concentrations of a specified air pollutant greater than the appropriate Air Quality Objective  |
| <b>EXPOSURE ASSESSMENT</b>                   | An assessment of a development where residential accommodation or other relevant exposure is proposed and there is likely to be exposure to concentrations above the air quality objective levels.  |
| <b>HDV</b>                                   | Heavy duty vehicle (lorry or bus greater than 3.5 tonnes gross vehicle weight)  |
| <b>LAQM.TG (16)</b>                          | Local Air Quality Management Technical Guidance (2018). This document provides national advice on how local authorities should assess air quality   |
| <b>LOW EMISSION STRATEGY (LES)</b>           | Overarching council strategy to integrate policies and practices to achieve year on year vehicle emission reductions, optimising opportunities for national funding assistance  |

|   |  |
|---|--|
| <b>LOW EMISSION ZONE (LEZ)</b>          | Council area in which emission standards apply for either road transport vehicles or power generation/industrial emissions. The council can set emission standards that differ in standard and scope from the Government requirements for implementing Clean Air Zones for vehicles                                      |
| <b>LDV</b>                              | Light duty vehicle (car or small van less than 3.5 tonnes gross vehicle weight)  |
| <b>LIMIT VALUES/EU LIMIT VALUES</b>     | The maximum pollutant levels set out in the EU Daughter Directives on Air Quality. In some cases the limit values are the same as the national air quality objective, but may allow a longer period for achieving  |
| <b>MITIGATION</b>                       | Mitigation measures will minimise, but not necessarily remove, the impact of or effect of poor air quality on a development  |
| <b>NATIONAL AIR QUALITY OBJECTIVES</b>  | See Air Quality Objectives   |
| <b>NATIONAL AIR QUALITY PLAN</b>        | Government Plan to improve roadside concentrations of nitrogen dioxide (July 2017)   |
| <b>NET POWER</b>                        | The engine power in kw obtained on a test bench at the end of the crankshaft, or its equivalent, measured in accordance with the method of measuring the power of internal combustion engines specified in UNECE Regulation no.12  |
| <b>NON-ROAD MOBILE MACHINERY (NRMM)</b> | Diggers, cranes, bulldozers, plant etc used on construction sites  |
| <b>NO<sub>2</sub></b>                   | Nitrogen dioxide   |
| <b>NOx</b>                              | NOx = nitrogen oxides, which includes nitric oxide and nitrogen dioxide. Most pollution sources emit nitrogen oxides primarily as nitric oxide. However, once in the atmosphere nitric oxide can be converted to nitrogen dioxide. Therefore, it is important to know the concentrations of both NOx and NO <sub>2</sub> |
| <b>OFFSETTING</b>                       | Measures which 'compensate' for anticipated increases in pollution in the area but not necessarily at the exact locality. This might be for example by funding more general measures in the air quality action plan  |
| <b>PM</b>                               | Particulate matter   |
| <b>PM<sub>2.5</sub></b>                 | Particulate matter with a diameter of 2.5 microns or less  |
| <b>PM<sub>10</sub></b>                  | Particulate matter with a diameter of 10 microns or less   |
| <b>PART A1 AND A2 PROCESSES</b>         | Industrial processes which are regulated under the Pollution Prevention and Control (PPC) Regulations and subsequent Integrated Pollution Prevention and Control (IPPC) for emissions to all media (i.e. atmosphere, land and water)   |
| <b>PART B PROCESSES</b>                 | Industrial processes which are regulated under the Local Air Pollution Control (LAPC) and Local Air Quality Pollution Prevention and Control (LAPPC) Regulations for emissions to air only   |
| <b>POINT SOURCES</b>                    | Any single identifiable source of pollution from which pollutants are discharged, such as a pipe or chimney  |

|                              |   |
|------------------------------|---|
| <b>POLLUTING DEVELOPMENT</b> | A development which will directly or indirectly increase levels of relevant pollutants. This may include industrial processes but may also include developments which could cause increased traffic emissions   |
| <b>SENSITIVE DEVELOPMENT</b> | A development which would allow users of the site to potentially be exposed to pollutants above the objective for the relevant period. For example, the introduction of a new residential development into an area where an air quality objective is already exceeded, would create the potential for the exposure of residents to poor air quality above the objective level. Incidentally, this type of development may also generate significant additional traffic flow and also be a polluting development |

CHAPTER 1

# Purpose of the guidance

**Warwick District Council has to weigh up economic, social and environmental factors when deciding to grant or refuse planning permission or decide if conditions are required to achieve sustainable development. Air quality is a material consideration that planners are required to take into account when making their plans and when taking planning decisions.**

In view of the air quality issues identified within the District, and the withdrawal of general planning guidance on air quality as part of the National Planning Policy Framework (NPPF), there is a need for local planning guidance on air quality. Warwick District Council has developed this guidance to assist developers. The guidance establishes the principle of Warwick District as an emission reduction area and requires developers to use reasonable endeavours to minimise emissions and, where necessary, offset the impact of development on the environment. It supersedes the Low Emission Strategy Guidance for Developers (2014).

This guidance aims to simplify the consideration of air quality impacts associated with development schemes and focus on incorporation of mitigation at design stage, countering the cumulative impacts of aggregated developments, providing clarity to developers and defining of sustainability in air quality terms.

The objectives of this SPD / Guidance are:

- Improve the consideration of air quality & health impacts in the planning process, in line with national / local policy and practice
- to help ensure consistency in the approach to dealing with air quality and planning in the district;
- to highlight the existing policy framework in the district, and emphasise the importance of air quality as a material planning consideration;
- to identify the circumstances where detailed assessments and/or low emission strategies will be required as part of planning applications;
- to provide guidance on measures that can be implemented to mitigate the potentially harmful impacts of new developments on air quality in the district;
- to provide guidance on the use of planning conditions and Section 106 obligations to improve air quality; and
- to encourage co-benefits of reducing Carbon and noise emissions

## CHAPTER 2

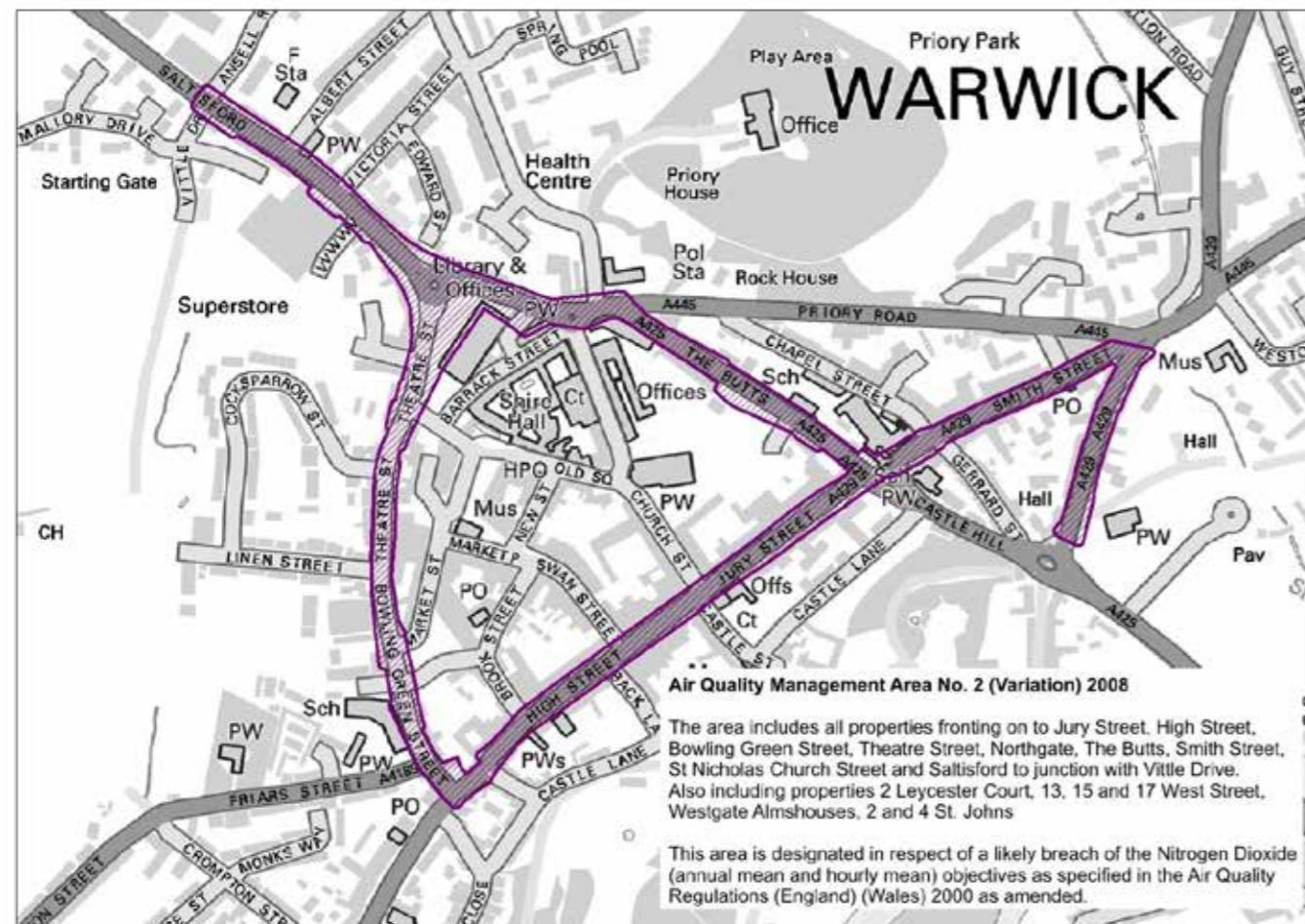
# Local Air Quality



Warwick District Council has designated five air quality management areas (AQMA) due to elevated annual average concentrations of nitrogen dioxide (NO<sub>2</sub>). The AQMAs include Warwick Town Centre, Coventry Road (Warwick), Leamington Spa and two AQMAs in Kenilworth. These AQMAs are shown in Maps 1 to 5 respectively.

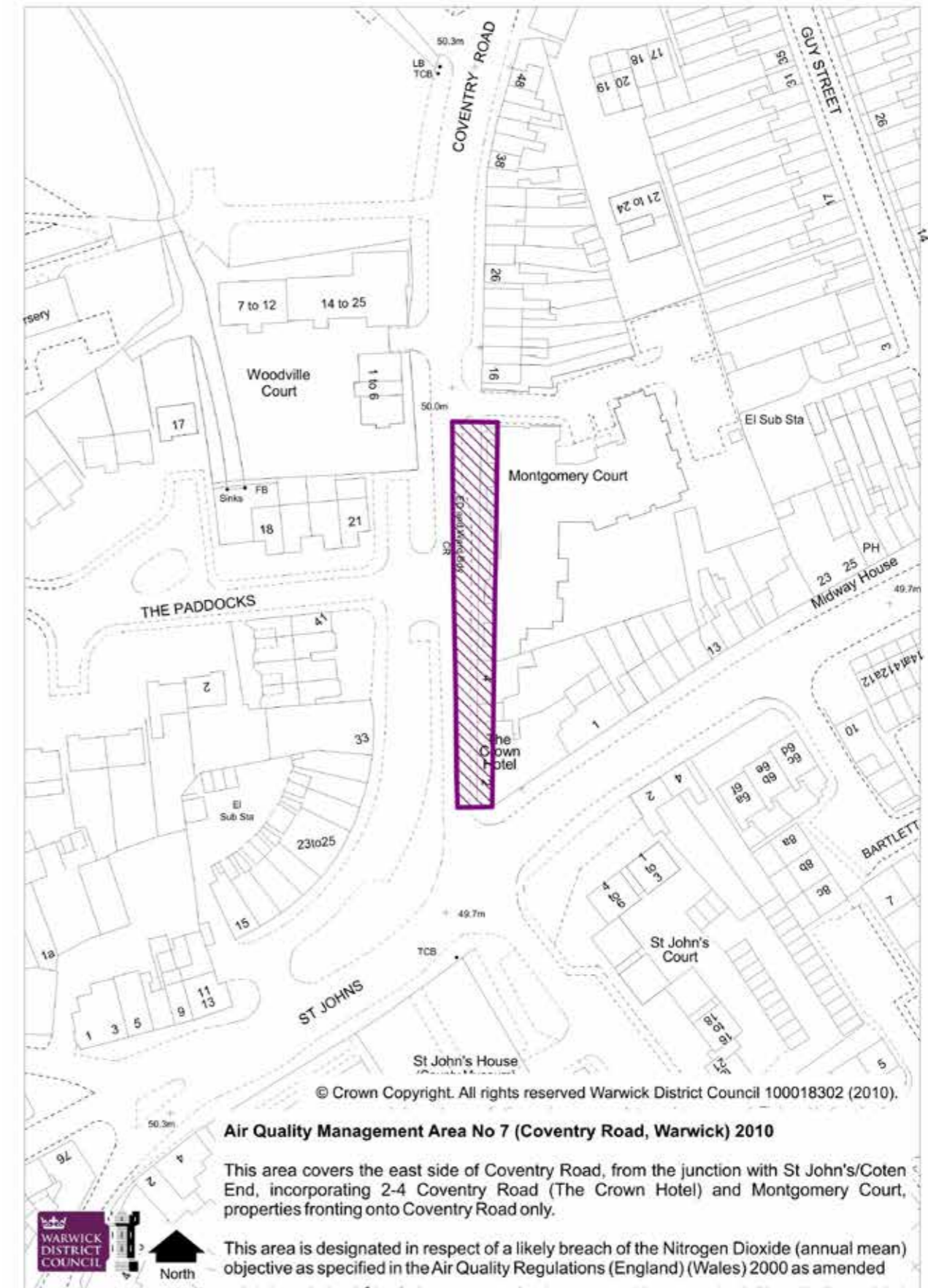
Further information on air quality in the Warwick district, including air quality monitoring data, can be found in our latest Annual Status Report<sup>1</sup>. A copy of our current Air Quality Action Plan (AQAP) can also be found on the Council website<sup>1</sup>

**Map 1 – Warwick Town Centre Air Quality Management Area (AQMA)**



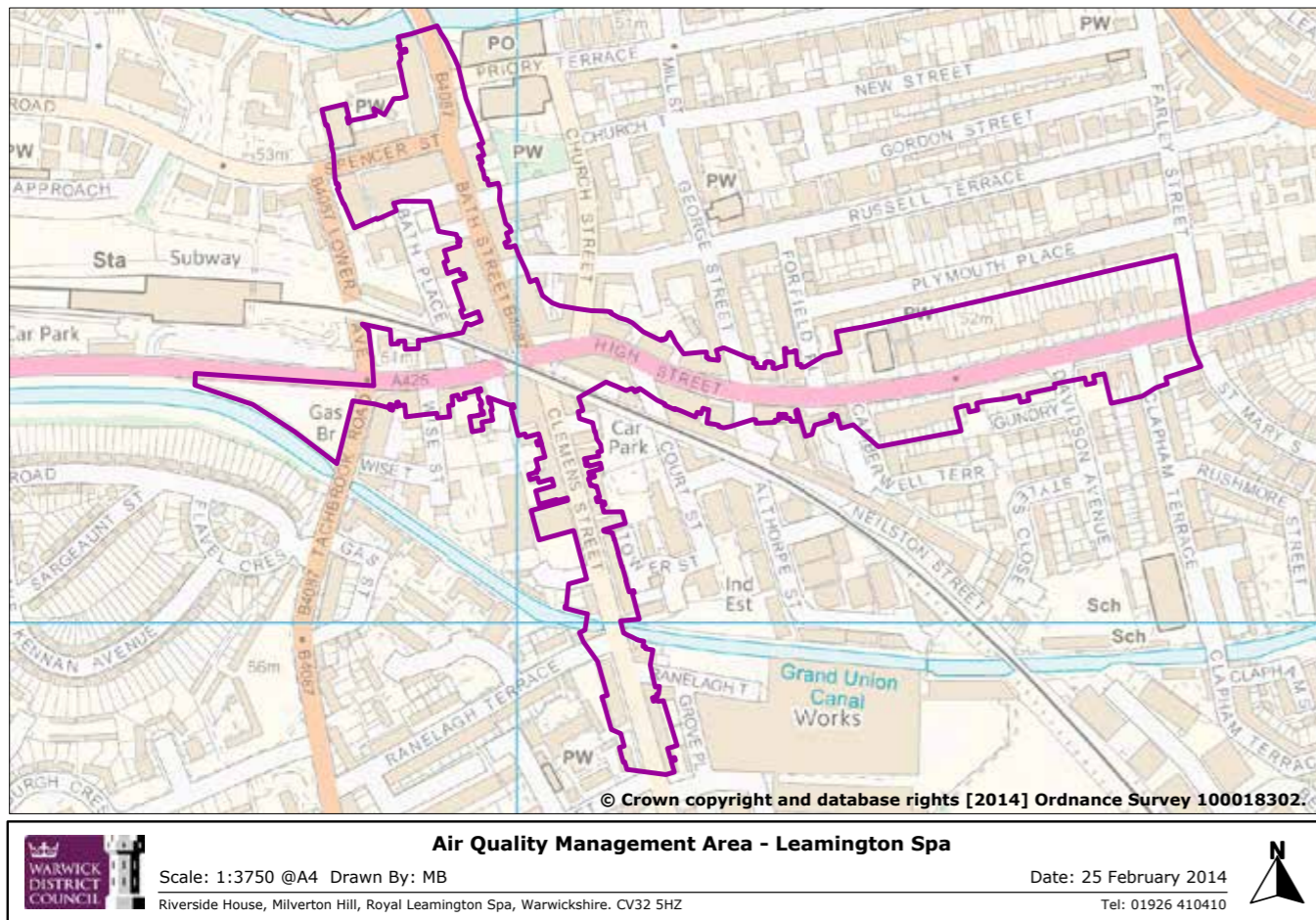
<sup>1</sup>[https://www.warwickdc.gov.uk/info/20505/air\\_pollution](https://www.warwickdc.gov.uk/info/20505/air_pollution)

**Map 2 – Coventry Road Air Quality Management Area (AQMA)**





**Map 3 – Leamington Spa Air Quality Management Area (AQMA)**



**Map 4 – Warwick Road, Kenilworth Air Quality Management Area (AQMA)**



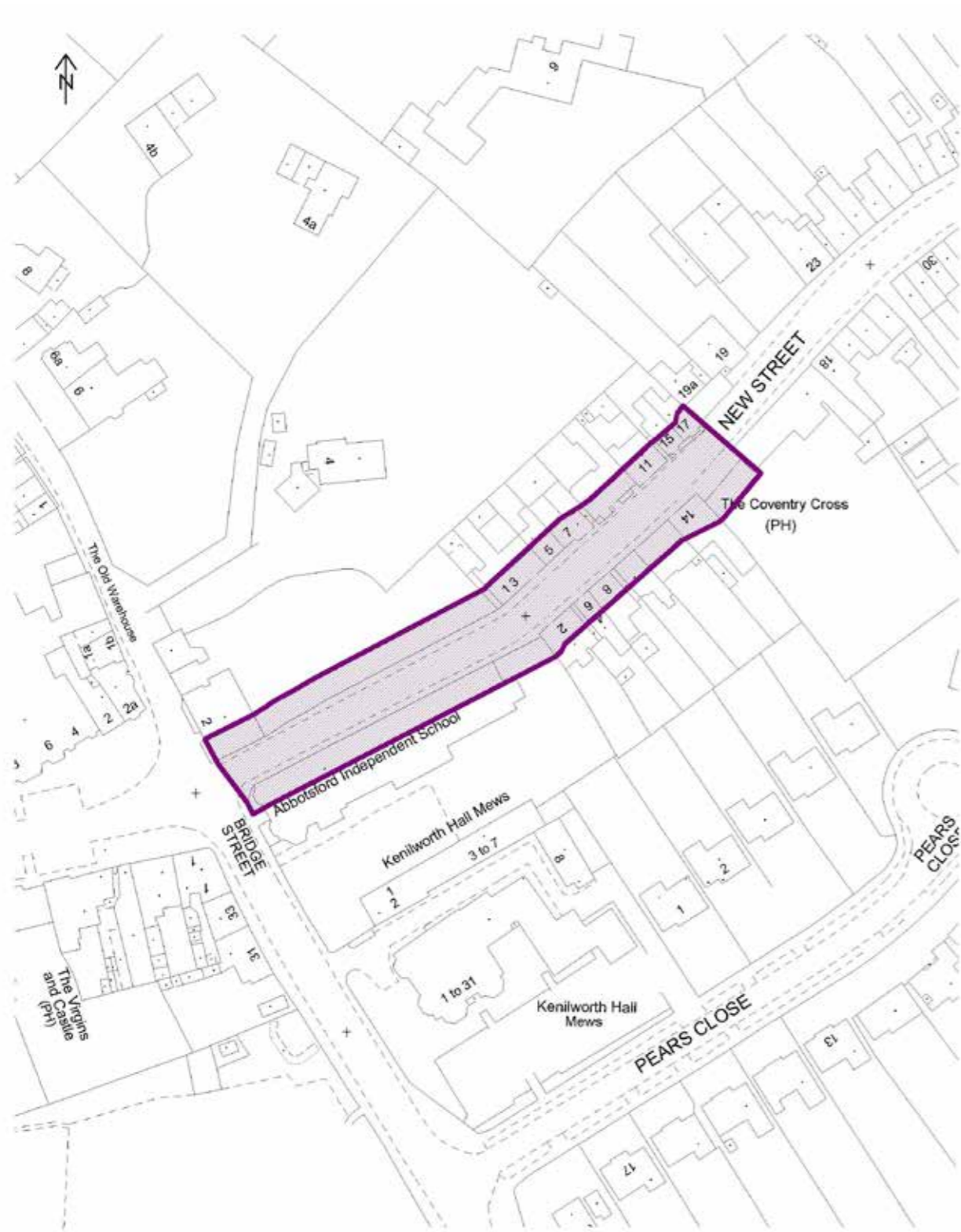
**Air Quality Management Area No. 4 (Warwick Road, Kenilworth) 2008**

This area includes all properties fronting onto Warwick Road from the junction of Station Road to the junction with Waverley Road.

This area is designated in respect of a likely breach of the Nitrogen Dioxide (annual mean) objective as specified in the Air Quality Regulations (England) (Wales) 2000 as amended.



## Map 5 – New Street, Kenilworth Air Quality Management Area (AQMA)



### Air Quality Management Area No. 5 (New Street, Kenilworth) 2008

This area includes all properties fronting onto New Street from the junction of Bridge Street / Fieldgate Lane up to and including N<sup>o</sup>. 17.

This area is designated in respect of a likely breach of the Nitrogen Dioxide (annual mean) objective as specified in the Air Quality Regulations (England) (Wales) 2000 as amended.

While levels of particulate matter ( $PM_{10}$ ) in the district do not breach Air Quality Objectives it is acknowledged that fine particulate matter ( $PM_{2.5}$ ) levels have a significant impact on health across the district and reductions in concentrations below EU Limit Value levels will still bring significant health benefits to the local population. The equivalent of around 1 in 20 deaths are estimated to be attributed to  $PM_{2.5}$  concentrations accounting for 64 deaths (over 25s) and 694 associated life-years lost in 2010<sup>3</sup>.

For the purpose of improving air quality and health impacts in the Warwick district this guidance is concerned with achieving and maintaining compliance with Air Quality Objectives and with improving air quality further, particularly with respect to particulate concentrations.

<sup>3</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/332854/PHE\\_CRCE\\_010.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/332854/PHE_CRCE_010.pdf)

## CHAPTER 3

# National Policy & Practice

### 3.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) 2018 sets out the overarching national policy objectives relating to air quality and development. Most notably, it emphasises that development should, wherever possible help to improve local environmental conditions such as air quality. The most relevant paragraphs in respect of air quality are set out below:

- 170** Planning policies and decisions should contribute to and enhance the natural and local environment by:
- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality;
- 181** Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.

The following paragraph outlines the relationship between the planning process and the environmental permitting system:

- 183** The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.

The following paragraphs recognise the impact of traffic on air quality and health and the benefits of sustainable transport modes

- 102** Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for mitigation and for net gains in environmental quality;

**103** The planning system should actively manage patterns of growth in support of these objectives. 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.

- Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.
- Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.”

The NPPG states that where a planning proposal, including mitigation, prevents sustained compliance with EU Limit Values or National Objectives for air quality and cannot be made acceptable then refusal of planning permission should be considered.

### 3.2 National Planning Practice Guidance

**National Planning Practice Guidance (NPPG)<sup>6</sup> provides advice to planning authorities on implementing the NPPF, including guidance on how air quality can be considered as part of the planning process, stating that, “Local Plans may need to consider:**

- the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments;
- the impact of point sources of air pollution (pollution that originates from one place); and,
- ways in which new development would be appropriate in locations where air quality is or likely to be a concern and not give rise to unacceptable risks from pollution. This could be through, for example, identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable.

When deciding whether air quality is relevant to a planning application, considerations may include whether the development would:

- Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.
- Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area;

<sup>6</sup><https://www.gov.uk/government/collections/planning-practice-guidance>



## CHAPTER 4

# Local Plan

**The Planning and Compulsory Purchase Act 2004, amended by the Localism Act 2011 requires planning authorities to prepare Local Plans. The Warwick District Local Plan 2011 to 2029 was adopted in September 2017 and includes the following policies:**

### TR1 Access and Choice

Development will only be permitted that provides safe, suitable and attractive access routes for pedestrians, cyclists, public transport users, emergency vehicles, delivery vehicles, refuse vehicles and other users of motor vehicles, as appropriate.

Development proposals will be expected to demonstrate that they:

- a) are not detrimental to highway safety;
- b) are designed to provide suitable access and circulation for a range of transport modes including pedestrians, cyclists, emergency services and public transport services;
- c) create safe and secure layouts for motorised vehicles, cyclists, pedestrians and public transport and integrate the access routes into the overall development;
- d) where practical, incorporate facilities for charging plug-in and other ultra-low emission vehicles where the development proposals include provision for off street parking and is for one or more dwelling, and;
- e) have taken account of the needs of people with disabilities by all modes of transport.

### TR2 Traffic Generation

All large-scale developments (both residential and non-residential) that result in the generation of significant traffic movements should be supported by a Transport Assessment, and where necessary a Travel Plan, to demonstrate the practical and effective measures to be taken to avoid the adverse impacts of traffic.

Any development that results in significant negative impacts on the health and wellbeing of people in the area as a result of pollution, noise or vibration caused by traffic generation will not be permitted unless effective mitigation can be achieved.

Any development that results in significant negative impacts on air quality within identified Air Quality Management Areas or on the health and wellbeing of people in the area as a result of pollution should be supported by an air quality assessment and, where necessary, a mitigation plan to demonstrate practical and effective measures to be taken to avoid the adverse impacts.

A Transport Statement may be required for development that has relatively small transport implications in line with the Guidance on Transport Assessments.

All measures required in the policy should take full account of the cumulative impact of all development proposed in this Plan (and any other known developments) on traffic generation and air quality.

<sup>7</sup>[https://www.warwickdc.gov.uk/downloads/file/1971/low\\_emission\\_strategy\\_guidance](https://www.warwickdc.gov.uk/downloads/file/1971/low_emission_strategy_guidance)

### NE5 Protection of Natural Resources

Development proposals will be permitted provided that they ensure that the district's natural resources remain safe, protected, and prudently used.

Development proposals will be expected to demonstrate that they:

- a) do not give rise to soil contamination or air, noise, radiation, light or water pollution where the level of discharge, emissions or contamination could cause harm to sensitive receptors;
- b) ensure that, where evidence of contamination exists, the land is made fit for its intended purpose and does not pose an unacceptable risk to sensitive receptors;
- c) do not result in a reduction in the quality or quantity of groundwater resources; this includes the protection of principal aquifers and the source protection zones associated with public supply boreholes within the northern part of the district; there will be a presumption against development within a groundwater SPZ1 that would physically disturb an aquifer;
- d) avoid the best and most versatile agricultural land unless the benefits of the proposal outweigh the need to protect the land for agricultural purposes;
- e) do not sterilise mineral resources identified as of particular importance unless it can be demonstrated that it would not be practicable and environmentally feasible to extract the identified mineral resource prior to development taking place;
- f) where appropriate, identify how the proposals will contribute to the EU Water Framework Directive and the Severn River Basin Management Plan, which requires the restoration and enhancements of water bodies to prevent deterioration and promote recovery of waterbodies.

The Council has also published Low Emission Strategy Guidance for Developers (2014)<sup>7</sup> as an addendum to the Air Quality Action Plan. This document updates and replaces the Low Emission Strategy Guidance.

## CHAPTER 5

# Development Classification, Assessment and Mitigation

The assessment of air quality for relevant planning applications should follow a three-stage process:

1. Determining the classification of the development proposal;
2. Assessing and quantifying the impact on local air quality;
3. Determining the level of a mitigation required by the proposal to make the scheme acceptable.

Not all development may fit into this classification model and further guidance on specific developments has been provided in Section 5.5 of this guidance.

## 5.1 Stage 1 - Development Type Classification

The classification of developments is shown in tables 1 and 2. The assessment and mitigation of development proposals is shown in figure 1.

**Table 1 – Air quality classification of developments**

| SCHEME TYPE | MINOR   | MEDIUM   | MAJOR   |
|-------------|---|--|---|
| Threshold   | Below threshold criteria for a Transport Assessment <sup>8</sup> or Travel Plan | Meets threshold criteria for a Transport Assessment or Travel Plan | Medium type developments which also trigger any of the following criteria:<br>i) Where development is within or adjacent <sup>9</sup> to an AQMA or CAZ<br>ii) Where development requires an EIA <sup>10</sup> and air quality is to be considered<br>iii) Where any of the criteria in Table 2 are triggered |
| Assessment  | Exposure Assessment where applicable (see 5.2)                                  | Exposure Assessment where applicable (see 5.2)                     | Air Quality Assessment required including an evaluation of changes in emissions <sup>11</sup><br>Exposure Assessment where applicable (see 5.2)   |
| Mitigation  | Type 1  | Types 1 and 2  | Types 1,2 and 3   |

The Department for Transport (DfT) threshold criteria for Transport Assessments (TA) can be found in **Appendix 1**.

<sup>8</sup>[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/263054/guidance-transport-assessment.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263054/guidance-transport-assessment.pdf)

<sup>9</sup>Where development has potential to impact on concentrations in AQMA or CAZ

<sup>10</sup><https://www.gov.uk/guidance/environmental-impact-assessment>

<sup>11</sup>Assessment includes monetisation of the impacts arising from emission changes in line with Defra IGCB Damage Costs

**Table 2 – Additional Trigger Criteria for Major Developments**

- Proposals in areas where sustained compliance with EU Limit Values may be at risk<sup>12</sup>
- Any development proposing a net increase of 100 or more parking spaces
- Any development that could increase the existing traffic flows on roads of > 10,000 AADT by 5% or more
- Any development that causes a change in LDV (cars and small vans) flows of:
  - more than 100 AADT within or adjacent to an AQMA, CAZ or exceedance area
  - more than 500 AADT elsewhere
- Any developments that could increase traffic flows by 5% or more in road canyons<sup>13</sup> (or creates a canyon) with > 5,000 AADT
- Any development that causes a change in HDV flows (lorries, large vans and buses) of:
  - more than 25 AADT within or adjacent to an AQMA, CAZ or exceedance area
  - more than 100 AADT elsewhere
- Proposals that could introduce or significantly alter congestion (DfT Congestion) and includes the introduction of substantial road infrastructure changes
- Proposals that reduce average speeds by more than 10 km per hour
- Proposals that include additional HGV movements by more than 10% of total trips
- The construction, widening or repositioning of a road in the vicinity of sensitive receptors<sup>14</sup>
- Where a centralised combustion unit of thermal input >300kWh is proposed
- All biomass boiler and other large novel fuel appliance applications
- All stand-by/short-term power generation units regulated by the Environment Agency

## 5.2 Stage 2 – Air Quality Impact Assessment

### Exposure Assessment – MINOR, MEDIUM and MAJOR classified 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. It can be seen from table 1 that no assessment is required for minor and medium impact schemes expect for the need to consider whether the development will expose future occupiers to unacceptable levels of N02 and or particular matter.

An assessment of the likelihood of introducing additional exposure within Warwick District will be determined using the following criteria:

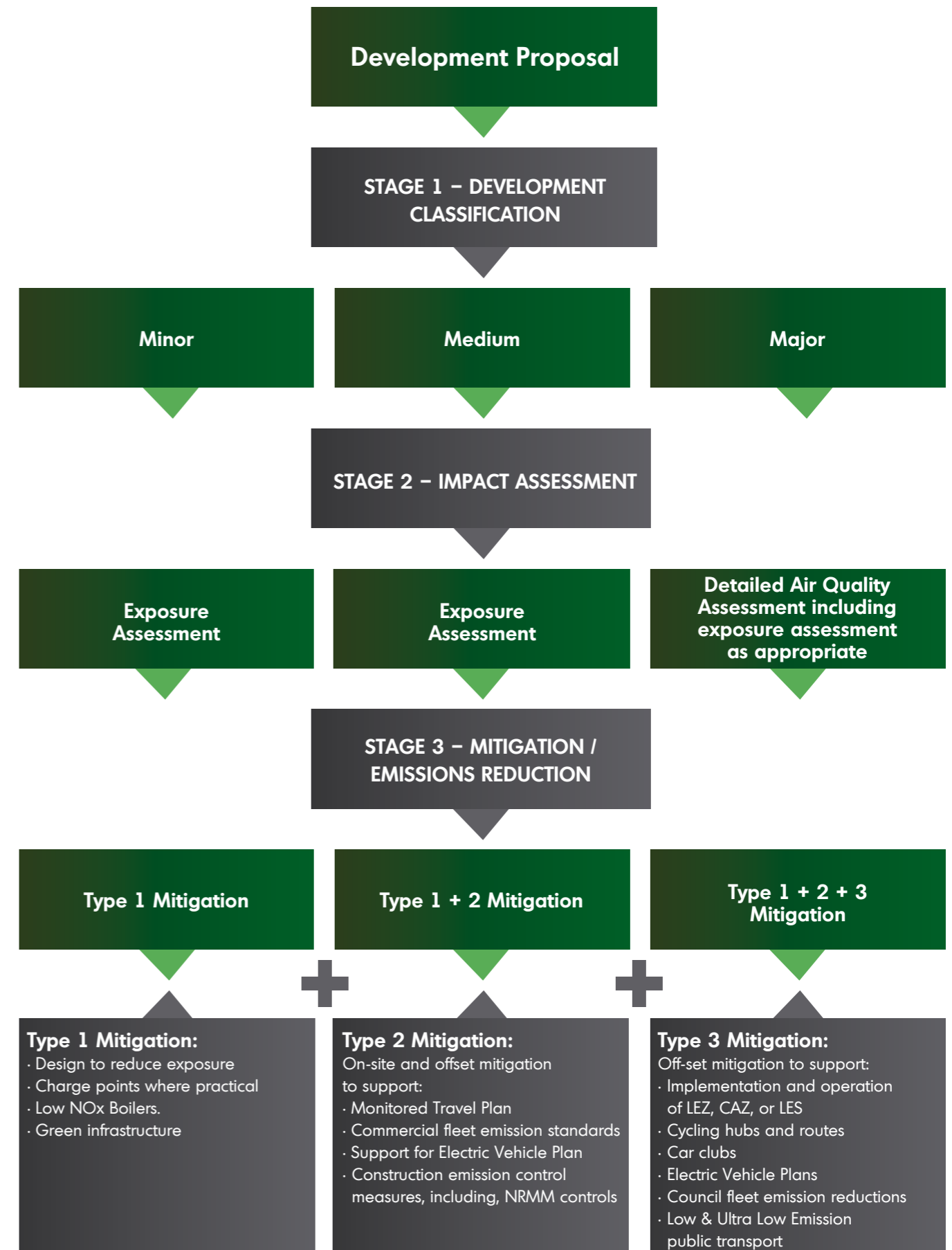
- The proposal is adjacent to or within an AQMA;
- The proposal is in a location 20m from roads at or above the relevant national objective highlighted on the DEFRA GIS modelled maps - <http://uk-air.defra.gov.uk/data/gis-mapping>
- The proposal is one of the following Land Use types; and within 20m of roads with >10,000 AADT
  - C1 to C3;
  - C4 (Homes of Multiple Occupation);
  - D1
  - and within 20m of roads with >10,000 AADT



Examples of where the national air quality objectives apply are detailed in Local Air Quality Management Technical Guidance (T616) by DEFRA.

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

**Figure 1 – Classification, assessment & mitigation of new developments**



<sup>12</sup>Where current monitoring data shows NO2 annual average concentrations of 36 ug/m3 or more

<sup>13</sup>Where the height of buildings adjacent to both sides of the road are higher than the width between them. Local knowledge and professional judgement will be required to help identify road canyons

<sup>14</sup>See section 5.2

<sup>15</sup><https://laqm.defra.gov.uk/documents/LAQM-T616-February-18-v1>

## MAJOR Classified Proposals

It is important that all major schemes should identify suitable assessment requirements and potential mitigation through pre-application discussions. 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. In addition, an exposure assessment may be required in line with criteria set out on page 27.

Air Quality Assessment requirements:

- The identification of the level of exposure through the change in pollutant concentrations at relevant receptors resulting from the proposed development. It must take into account the cumulative air quality impacts of committed developments (i.e. those with planning permission) and assess the potential impacts arising from construction and demolition activities associated with the proposed development. Mitigation measures should be identified and modelled where practicable.
- 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 Department for the Environment, Food and Rural Affairs (DEFRA) Technical Guidance Note LAQM TG. (16)<sup>16</sup> (or any subsequent revisions). Further details of the air quality assessment requirements can be found in **Appendix 2** and through the Council's Environmental Health team<sup>17</sup>.

All Air Quality Assessments received will be assessed by the Council against the requirements of this Technical Guidance Note. If the requirements are not met, Warwick District Council may request that the applicant carries out the assessment again. If the assessment does not meet the required standards, the application may be refused.

**B.** The pollutant emissions costs calculation will identify the damage costs associated with the proposal and will assist WDC in assessing the overall impacts on air quality arising from major developments. WDC will use the damage costs as a guide in considering the appropriate scale and kind of mitigation that is required to make certain major schemes acceptable in terms of air quality. It should be noted however that applicants must demonstrate that proposed mitigation is likely to effectively address the adverse impact of development in air quality terms. Failure to do so may result in the application being refused. It is possible therefore that in some instances mitigation schemes might need to exceed the value of the damage cost calculation, or conversely they might have a value equivalent to less than the damage cost calculated. This will need to be evidenced on a case by case basis and the overall benefit of the scheme will be taken into account in making the site acceptable. The calculation should utilise the most recent DEFRA Emissions Factor Toolkit<sup>18</sup> 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<sup>19</sup>. The calculation process includes:

- Identifying the additional trips generated by the proposal (from the Transport Assessment);
- The emissions calculated for the pollutants of concern (NO<sub>x</sub> and PM<sub>10</sub>) [from the Emissions Factor Toolkit];
- The air quality damage costs calculation for the specific pollutant emissions (from DEFRA IGCB);
- The result is totalled for a five-year period to enable mitigation implementation.

The calculation is summarised below. Further information can be obtained from the Council's Environmental Health team. **Should there be no net increase in trips arising from a development scheme then the damage costs from transport related emissions are zero.** Further information on damage costs can be found in Appendix 3.

Road Transport Emission Increase =

$\sum$ [Estimated trip increase for 5 years X Emission rate per 10 km per vehicle type X Damage Costs]

## 5.3 Stage 3 – Mitigation

Where mitigation is not integrated into a proposal, we will require this through planning conditions. The NPPF (paragraph 32) states that 'where significant adverse impacts are unavoidable, suitable mitigation measures should be proposed (or where it is not possible, compensatory measures should be considered)'. If on-site mitigation is not possible then WDC will seek compensation for the identified air quality impacts through a Section 106 Agreement or similar agreement. Each development will require an air quality mitigation statement. This should set out the mitigation measures proposed and demonstrate their likely effectiveness. As a guide, it is anticipated that the value of the mitigation measures should be equivalent to the damage cost calculation as set out under section 5.2 above. Where adverse impacts cannot be appropriately mitigated, planning permission should be refused.

Example mitigation measures are presented for each type of proposal that demonstrate a minimum requirement. This is not an exhaustive list but a suggested suite of measures and will be adapted for particular locations and needs identified by the Council. We welcome the opportunity to work with developers to devise innovative measures that will lead to improving local air quality.

Type 1 mitigation is listed in Table 3 and Types 2 and 3 are listed in Tables 4 and 5 respectively.

Due to elevated concentrations of particulate matter in the district, Medium and Major developments will be required to implement suitable abatement controls for the use of non-road mobile machinery (NRMM) – see Table 6.

<sup>16</sup><https://laqm.defra.gov.uk/technical-guidance/>

<sup>17</sup><https://www.warwickdc.gov.uk/info/20501/pollution>

<sup>18</sup><https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>

<sup>19</sup><https://www.gov.uk/guidance/air-quality-economic-analysis>

**TABLE 3 – TYPE 1 MITIGATION**

**Plug-in Vehicle Re-Charging:**

Residential:

1 charging point per unit (dwelling with dedicated parking) or 1 charging point per 10 spaces (unallocated parking) and ensure appropriate cabling is provided to enable increase in future provision

Commercial/Retail:

10% of parking spaces (32 amp) which may be phased with 5% initial provision and the remainder at an agreed trigger level. At least 1 charging unit should be provided for every 10 disabled parking spaces. Where 50 parking spaces or more are provided then 1 rapid charging unit (43kW/50kW) per 50 spaces shall also be considered and parking time limited to a maximum of 1 hour for public access car parks.

Industrial:

10% of parking spaces which may be phased with 5% initial provision and the remainder at an agreed trigger level. At least 1 charging unit should be provided for every 10 disabled parking spaces. Where 50 parking spaces or more are provided then 1 rapid charging unit (43kW/50kW) per 50 spaces shall also be considered and parking time limited to a maximum of 1 hour.

All charging unit shall be installed where practical. Developers installing public charging points shall ensure that the National Charge point Registry is updated.

**Green Infrastructure and planting**

Where it can be shown that such infrastructure will reduce exposure from air pollution

**Type 2 Mitigation**

The following tables provide a suite of measures to be considered where appropriate.

**TABLE 4 – TYPE 2 MITIGATION**

- Monitored Travel Plan, including mechanisms for discouraging high emission vehicle use and encouraging the uptake of low emission fuels and technologies<sup>20</sup>
- Measures to support public transport infrastructure and promote use
- Measures to support cycling and walking infrastructure
- Measures to support an Electric Vehicle Plan
- Designated parking spaces and differentiated parking charges for low emission vehicles
- Non-road mobile machinery (NRMM) controls (see Table 6)

Commercial and industrial development specific:

- Use reasonable endeavours to use/require vehicle use complying with the latest European Emission Standard from premises opening and to be progressively maintained for the lifetime of the development
- Provide a fleet emission reduction strategy/low emission strategy, including the uptake of low emission fuels and technologies, such as ultra-low emission service vehicles

**Type 3 Mitigation**

**TABLE 5 – TYPE 3 MITIGATION**

**Off-set mitigation to support:**

- Implementation and operation of Clean Air Zones (CAZ), Low Emission Zones (LEZ) or Low Emission Strategies (LES)
- Growth in low and ultra-low emission public transport, including buses
- Electric Vehicle Plans
- On-street EV recharging
- Air Quality Monitoring programmes
- Car clubs (including electric) and car sharing schemes
- Cycling Hubs and corridors, including bike and e-bike hire schemes
- Plugged-in development and demonstration schemes e.g. new occupants given trial demonstration of plug-in vehicle
- Contributions to subsidised public transport for staff or residents
- Low emission waste collection services
- Contributions to renewable fuel and energy generation projects
- Infrastructure for low emission, alternative fuels e.g. refuse collection and community transport services

Further information on the suitability of mitigation for developments can be obtained from the Council's Environmental Health team and through pre-application discussions.

**Construction and demolition - mitigation**

Construction management plans (CMPs) will be used to address how adverse impacts associated with proposed development activities, and any cumulative impacts of other nearby construction sites, will be mitigated and managed. CMPs will normally be secured by a planning condition and will generally be applicable to MEDIUM and MAJOR developments. A CMP will be required to consider a number of environmental issues. With regards to air quality a CMP must consider adverse impacts generated by dust, non-road mobile machinery (NRMM), and any other harmful emissions to air. The level of detail required in a CMP will depend on the type and scale of a development. Further information on NRMM requirements has been provided in Table 6 of this document. These NRMM controls will be regulated through the use of CMPs. Contractors will be required to provide an inventory of all NRMM to be used at a development site along with statements of conformity and proof of emission limits.

An assessment of the air quality impacts of demolition, earthworks, construction, and track out will normally be carried out at the same time as an assessment of a development's operational impacts. There are some occasions, however, where a construction and demolition impact assessment can be carried out prior to commencement of the development as part of a CMP. An assessment of dust from demolition and construction activities should be conducted in accordance with the principles of the Institute of Air Quality Management's (IAQM) 'Guidance on the assessment of dust from demolition and construction' (or any subsequent revisions) and appropriate mitigation measures shall be proposed in line with the assessment results. Please see Appendix 2 of this document for further information on assessing air quality impacts.

<sup>20</sup>Where the developer funds the monitoring of a travel plan



**TABLE 6 – NON-ROAD MOBILE MACHINERY (NRMM) CONTROLS**

NRMM of net power between 37kW and 560kW will be required to meet the standards based upon the engine emissions standards in EU Directive 97/68/EC and its subsequent amendments. This will apply to both variable and constant speed engines for both NOx and PM.

These standards are:

(a) NRMM used on the site of any MEDIUM classified development will be required to meet Stage IIIA of the Directive as a minimum.

(b) NRMM used on any MAJOR classified development will be required to meet Stage IIIB of the Directive as a minimum.

From 1 September 2020 the following changes will apply:

· (a) NRMM used on any construction or demolition site within urban areas will be required to meet Stage IIIB of the Directive as a minimum.

· (b) NRMM used on any MEDIUM or MAJOR classified development will be required to meet Stage IV of the Directive as a minimum.

The requirements may be met using the following techniques;

(a) Reorganisation of NRMM fleet (b) Replacing equipment (with new or second-hand equipment which meets the policy) (c) Retrofit abatement technologies (d) Re-engining.

All eligible NRMM should meet the standards above unless it can be demonstrated that the machinery is not available or that a comprehensive retrofit to meet both PM and NOx emission standards is not feasible.

## 5.4 Assessing the acceptability of a scheme

WDC will consider all material considerations in determining the acceptability of a scheme. Evidence of how proposals have addressed the three stage process set out in this SPD will be required. Any conclusions regarding the significance of air quality impact or air quality impacts upon a scheme, may be considered in the context of local air quality knowledge and cumulative impacts.

Where adverse air quality impacts are identified, particularly where sustained compliance with EU Limit Values may be at risk and mitigation measures cannot be demonstrated as effective in mitigating these adverse impacts, the application will likely be refused.

## 5.5 Specific Issues

### 5.51 Heating

Minimum emission standards that are outlined below should be applied where relevant.

#### **Heating plant on developments outside of AQMA or urban areas that are >500m from an AQMA:**

Individual gas fired boiler <40mgNOx/kWh

Spark ignition engine 250mgNOx/Nm<sup>3</sup>

Compression ignition engine 400mgNOx/Nm<sup>3</sup>

Gas turbine 50mgNOx/Nm<sup>3</sup>

#### **Heating plant on developments in or adjacent to AQMA (within 500m of an AQMA):**

Individual gas fired boiler <40mgNOx/kWh

Spark ignition engine 95mgNOx/Nm<sup>3</sup>

Compression ignition engine 400mgNOx/Nm<sup>3</sup>

Gas turbine 20mgNOx/Nm<sup>3</sup>

### 5.52 Biomass boilers and other large novel fuel appliances

Biomass boiler provision has increased over recent years, supported by the financial benefits of the Government's Renewal Heat Incentive (RHI)<sup>21</sup>. However, the emissions from biomass plant can lead to significant emissions of NOx and PM, even from relatively small plant.

Biomass boiler plant and other large novel fuel appliance applications will be subject to a full air quality assessment and will be resisted in our urban areas unless mitigation is provided to achieve emissions of NOx and PM that are equivalent or lower than gas fired plant (see 5.51)

### 5.53 Standby / back-up power generation

All standby/back-up power generation applications will require a full air quality assessment to assess the acceptability of the site for such a scheme. Any assessment shall consider both the long and short term air quality impacts of the proposed standby/back up power generation scheme, and shall specify the maximum number of hours per year they will operate.

WDC expect all such assessments to include reasoning as to whether gas powered generation can be utilised in the first instance e.g. identify the provision of suitable gas mains in the vicinity.

Any diesel-powered generators will be required to incorporate abatement equipment such as selective catalytic reduction and particulate trap (SCRT).

### 5.54 Permitting under the Pollution Prevention and Control Act 1999 and the Environmental Permitting (England and Wales) Regulations 2016 (as amended)

Industrial processes which may range from large industrial plant to dry cleaners and paint spraying workshops, are regulated by the Environment Agency (Part A1 processes) and the Council (Part A2 and Part B processes). The planning regime must assume that the permitting regime will ensure the processes comply with their permits and the Act. The planning regime can, however consider whether a land use is appropriate and it must consider the exposure to pollutants.

All Part A and B Process developments requiring planning applications and where NO<sub>x</sub> and PM emissions are relevant will be required to carry out a detailed air quality assessment

### 5.55 Mechanical Ventilation

Air quality concentrations may affect the suitability of certain locations for sensitive developments and this should be assessed in line with section 5.2.

Some applications in areas of poor air quality have proposed mechanical ventilation as a solution to overcoming potential exposure to poor air quality. This may involve sealed windows / triple glazing with trickle vents and a forced ventilation system, incorporating filters to remove pollutants.

Not only do such schemes increase the energy requirements of developments but also provide a questionable living space in what is essentially a 'hermetically sealed unit' and should not be seen as an acceptable solution to mitigating against exposure, particularly where mechanical failure would make the situation even worse.

Any sensitive development in an area of pollutant exceedance should have regard to the following considerations:

- The sensitive development should be at least 20m from the curb, with the arrangement of living space to afford further separation from a pollutant source
- Take account of the height separation of living accommodation from a road source eg can residential dwellings be provided from floors 2 / 3 upwards with commercial premises at lower levels
- The use of green infrastructure to provide a barrier to an adjacent pollution source (see 5.56)
- The projected length of time that the sensitive dwelling will be exposed to elevated pollution levels from scheme completion
- Reduce the potential for internal pollution eg through electric cooking provision
- Provision of monitoring data to support applications for sensitive developments. This requirement should be agreed with the Council's Environmental Health team prior to commencement of monitoring

Where the above considerations cannot achieve acceptable exposure for a sensitive development then consideration should be given to the refusal of the scheme.

### 5.56 Green Infrastructure and Planting

Plants and trees may provide an aesthetically pleasing aspect to a scheme and may also be used to provide a barrier from a pollutant source such as a trafficked road.

While there is conflicting evidence as to whether green infrastructure can help reduce concentrations of NO<sub>2</sub>, it is acknowledged that certain types of shrubs and trees are effective at removing particulates from the atmosphere.

For example, a living wall or a framework for climbing plants may offer some protection between a pollution source such as a road and a dwelling. Additionally, certain types of trees such as varieties of pine, planted between a road and residential accommodation may help reduce exposure to particulates.

Careful consideration is needed as to the type of green infrastructure to be used as certain tree species can produce their own emissions, such as isoprenes, which may exacerbate air pollution. Furthermore, the retention of existing green infrastructure such as mature trees, on or around a site should be encouraged where appropriate.

### 5.57 Section 106 Agreements and the Community Infrastructure Levy (CIL)

WDC has adopted the Community Infrastructure Levy (CIL) At the time of writing, the Regulation 123 list includes a number of infrastructure projects that aim to improve air quality. However these are locationally specific and the list is subject to change over time. Therefore, subject to the rules on pooling, we will seek Section 106 Agreements (Town and Country Planning Act 1990) and other relevant obligations with developers to secure mitigation, including off-set, on larger schemes (Medium and Major) where appropriate.

Section 106 Agreements will only be sought where the following legal tests are satisfied:

- necessary to make the development acceptable in planning terms
- directly related to the development; and
- fairly and reasonably related in scale and kind to the development.

Additionally, Section 106 Agreements must also satisfy the policy tests in the NPPF, paragraph 56.

<sup>21</sup>[http://www.energysavingtrust.org.uk/scotland/grants-loans/renewables/renewable-heat-incentive?gclid=EAlalQobChML\\_ZiY2Z7Q2gIVgbHtCh0dwgxCEAAYASABEGKgVd\\_BwE](http://www.energysavingtrust.org.uk/scotland/grants-loans/renewables/renewable-heat-incentive?gclid=EAlalQobChML_ZiY2Z7Q2gIVgbHtCh0dwgxCEAAYASABEGKgVd_BwE)

# Appendix 1

**Department for Transport Criteria for Transport Assessments  
(now archived<sup>22</sup>)**

| LAND USE   | DESCRIPTION  | TA REQUIRED          |
|--|--|----------------------|
| <b>Food Retail (A1)</b>  | Retail sale of food goods to the public – supermarkets, superstore, convenience food store                                 | >800 m <sup>2</sup>  |
| <b>Non-Food Retail (A1)</b>  | Retail sale of non-food goods to the public; but includes sandwich bars or other cold food purchased and consumed off site | >1500 m <sup>2</sup> |
| <b>Financial and professional services (A2)</b>  | Banks, building societies and bureaux de change, professional services, estate agents, employment agencies, betting shops. | >2500 m <sup>2</sup> |
| <b>Restaurants and Cafés (A3)</b>  | Use for the sale of food for consumption on the premises.  | >2500 m <sup>2</sup> |
| <b>Drinking Establishments (A4)</b>  | Use as a public house, wine-bar for consumption on or off the premises.  | >600 m <sup>2</sup>  |
| <b>Hot Food Takeaway (A5)</b>  | Use for the sale of hot food for consumption on or off the premises.   | >500 m <sup>2</sup>  |
| <b>Business (B1)</b>   | (a) Offices other than in use within Class A2 (financial & professional).  | >2500 m <sup>2</sup> |
| <b>General industrial (B2)</b>   | (b) Research & development – laboratories, studios.  | >4000 m <sup>2</sup> |
| <b>Storage or Distribution (B8)</b>  | (c) Light industry   | >5000 m <sup>2</sup> |
| <b>Hotels (C1)</b>   | General industry (other than B1).  | >100 bedrooms        |
| <b>Residential Institutions (C2)</b>   | Storage or distribution centres – wholesale warehouses, distribution centres & repositories.                               | >50 beds             |
| <b>Residential Institutions (C2)</b>   | Hotels, boarding houses & guest houses   | >150 students        |
| <b>Residential institutions (C2)</b>   | Hospitals, nursing homes used for residential accommodation and care.  | >400 residents       |
| <b>Dwelling Houses (C3)</b>  | Boarding schools and training centres  | >80 units            |
| <b>Non-Residential Institutions (D1)</b>   | Institutional hostels, homeless centres.   | >1000 m <sup>2</sup> |
| <b>Assembly and Leisure (D2)</b>   | Dwellings for individuals, families or not more than six people in a single household.                                     | >1500 m <sup>2</sup> |
| <b>OTHER</b>   |  |                      |
| <b>1. Any development generating 30 or more two-way vehicle movements in any hour</b>                                    |  |                      |
| <b>2. Any developments generating 100 or more two-way vehicle movements per day</b>                                      |  |                      |
| <b>3. Any development proposing 100 or more parking spaces</b>   |  |                      |
| <b>4. Any development generating significant freight or HGV movements per day, or significant abnormal loads per day</b> |  |                      |
| <b>5. Any development proposed in a location where the local transport infrastructure is inadequate</b>                  |  |                      |
| <b>6. Any development proposed in a location within or adjacent to an Air Quality Management Area (AQMA)</b>             |  |                      |

# Appendix 2

<sup>22</sup><http://webarchive.nationalarchives.gov.uk/20100409053422/http://www.dft.gov.uk/adobepdf/165237/2026571guidanceontaappendixb>



## Air Quality Assessment Protocol to Determine the Impact of Vehicle Emissions from Development Proposals

An air quality assessment should clearly establish the likely change in pollutant concentrations at relevant receptors resulting from the proposed development. It must take into account the cumulative air quality impacts of committed developments (i.e. those with planning permission) and assess the potential impacts arising from construction and demolition activities associated with the proposed development.

Air quality assessments should consider NO<sub>x</sub> and PM emissions and NO<sub>2</sub> and PM concentrations

### Key Components of an Air Quality Assessment

The assessment will generally 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 TG.16. The study will comprise of:

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

The assessment report should include the following details:

#### A. 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;
- 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 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 NO<sub>x</sub>:No<sub>2</sub> 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<sub>2</sub> from NO<sub>x</sub>.

#### E. Model verification for all traffic modelling following DEFRA guidance LAQM.TG (16):

#### F. Identification of sensitive locations:

#### G. Description of baseline conditions:

#### H. Description of demolition/construction phase impacts:

#### I. Summary of the assessment results:

- Impacts during the demolition/construction phase;
- Impacts during the operation phase;
- The estimated emissions change of local air pollutants;
- Identified breach or worsening of exceedences of objectives (geographical extent)
- Whether Air Quality Action Plans are compromised;
- Apparent conflicts with planning policy and how they will be mitigated.
- Uncertainties, errors and verification

#### J. Mitigation measures.

## 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 would 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 LAQM.TG (16).

## Assessing Demolition/Construction Impacts

The demolition and construction phases of development proposals can lead to both nuisance dust and elevated fine particulate (PM10 and PM2.5) concentrations. Modelling is not appropriate for this type of assessment, as emission rates vary depending on a combination of the construction activity and meteorological conditions, which cannot be reliably predicted. The assessment should focus on the distance and duration over which there is a risk that impacts may occur. The Institute of Air Quality Management (IAQM)<sup>23</sup> has produced a number of documents to which this guidance refers. The document 'Guidance on the Assessment of dust from demolition and construction should be the reference for reporting the construction assessment.

## Cumulative Impacts

The NPPF (paragraph 181) recognises that a number of individual development proposals within close proximity of each other require planning policies and decisions to consider the cumulative impact of them. Difficulties arise when developments are permitted sequentially, with each individually having only a relatively low polluting potential, but which cumulatively result in a significant worsening of air quality. This will occur where:

- A single large site is divided up into a series of units, such as an industrial estate or retail park;
- A major development is broken down into a series of smaller planning applications for administrative ease; and
- There are cumulative air quality impacts from a series of unrelated developments in the same area.

The first two cases the cumulative impact will be addressed by the likelihood that a single developer will bring forward an outline application for the whole site which should include an air quality assessment as part of an Environmental Assessment. For major developments that are broken down into a series of smaller planning applications, the use of a 'Master or Parameter Plan' that includes an air quality assessment will address the cumulative impact.

# Appendix 3

<sup>23</sup>IAQM [www.iaqm.co.uk](http://www.iaqm.co.uk)

## Damage Costs: calculations and example

Damage costs are the costs to society (mainly health) per tonne of pollutant emitted. They provide an easy reckoning of the monetised value of changes in pollution. The Government publishes damage costs for NOx and PM and also provides an Emission Factor Toolkit to allow the calculation of the emissions from schemes over the coming years.

Applicants calculating damage costs should incorporate the following:

- The most recent version of the Emission Factor Toolkit
- Both NOx and PM to be considered
- Appropriate HGV % traffic split to be used
- Traffic speed of 30km / hour to be used
- The appropriate damage cost category as advised by the Council's Environmental Health team

The following example outlines the damage cost calculation process for an urban mixed-use development outside London, to be operational in 2019, including residential development in 2 blocks and a hotel. The trip generation for the residential scheme is low due to less than 50% parking level per dwelling, including 25% provision of electric vehicle charging points (and a further 25% potential) and cycle stores. The hotel scheme includes 100+ space parking provision. Service deliveries to both the residential and hotel scheme are also considered.

The scheme is categorised as 'outer conurbation (not London)' for damage costs.

**Step 1** – Using the trip increase for each aspect of the scheme calculate the annual emissions of NOx and PM (in tonnes) for each of the 5 years from opening.

| LAND USE              | PROJECTED YEARLY EMISSIONS (DEFRA EMISSION FACTOR TOOLKIT V8) TA REQUIRED |                   |                  |                  |                  |
|-----------------------|---|-------------------|------------------|------------------|------------------|
|                       | 2019  | 2020              | 2021             | 2022             | 2023             |
| Residential NOx       | 129.73952   | 120.58516         | 110.44020        | 100.85574        | 92.75155         |
| Residential PM        | 11.50558  | 11.31002          | 11.17497         | 11.06880         | 10.98908         |
| Hotel NOx             | 506.79502   | 471.03580         | 431.40703        | 393.96773        | 362.31073        |
| Hotel PM              | 44.94366  | 44.17977          | 43.65224         | 43.23749         | 42.92610         |
| Deliveries NOx        | 477.56736   | 409.78076         | 347.56394        | 296.07882        | 256.18598        |
| Deliveries PM         | 32.62307  | 31.71858          | 30.96677         | 30.38716         | 29.94013         |
| <b>Total NOx (kg)</b> | <b>1,114.1019</b>   | <b>1,001.4017</b> | <b>889.41117</b> | <b>790.90229</b> | <b>711.24826</b> |
| <b>Total PM (kg)</b>  | <b>98.07231</b>   | <b>87.20837</b>   | <b>85.79398</b>  | <b>84.69345</b>  | <b>83.85531</b>  |
| <b>Total NOx (t)</b>  | <b>1.1141019</b>  | <b>1.0014017</b>  | <b>0.8894111</b> | <b>0.7909022</b> | <b>0.7112482</b> |
| <b>Total PM (t)</b>   | <b>0.0980723</b>  | <b>0.0872083</b>  | <b>0.0857939</b> | <b>0.0846934</b> | <b>0.0838553</b> |

**Step 2** – Using the selected damage cost category, uplift the 2015 prices provided by the IGCB by 2% per annum to reflect the correct cost in each of the first 5 years from opening.

|            | PRICE PER TONNE OF POLLUTANT IN PROJECTED YEARS (DEFRA IGCB) |         |         |         |          | 2023     |
|------------|--|---------|---------|---------|----------|----------|
|            | 2015 price/tonne   | 2019    | 2020    | 2021    | 2022     |          |
| <b>NOx</b> | £31,776  | £34,395 | £35,083 | £35,784 | £36,500  | £37,230  |
| <b>PM</b>  | £87,770  | £95,003 | £96,903 | £98,841 | £100,817 | £102,833 |

**Step 3** – Multiply the tonnage of emissions for each pollutant by the damage cost price for each year. Provide a cumulative total for 5 years.

|                            | DAMAGE COSTS   |                |                 |                 |                 |
|----------------------------|----------------|----------------|-----------------|-----------------|-----------------|
|                            | 2019 (year 1)  | 2020           | 2021            | 2022            | 2023 (year 5)   |
| <b>NOx</b>                 | £38,319        | £35,132        | £31,826         | £28,867         | £26,479         |
| <b>PM</b>                  | £9,317         | £8,450         | £8,479          | £8,538          | £8,623          |
| <b>Totals (cumulative)</b> | <b>£47,636</b> | <b>£91,218</b> | <b>£131,523</b> | <b>£168,928</b> | <b>£204,030</b> |



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