

**Assessing air quality impacts in planning decisions in England: should we focus more on health?**

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### **Introduction**

Air quality has become a topic of significant concern in recent years due to increasing evidence of the detrimental public health impact of air pollution, particularly emissions from traffic. In the UK, public and governmental concern results from legal cases concluding that the Government has not been taking sufficient action to address high levels of nitrogen dioxide (NO<sub>2</sub>) (R(Client Earth)(3) v SSEFRA 2018). Recent reports have also highlighted the significant adverse health impact of poor air quality which accounts for some 64,000 premature deaths in the UK every year and that the cost of poor health related to air pollution has been estimated at £20bn in the UK each year (APPGAP 2020: 6). There has been significant interest in local air quality management practice, improving local assessment and action to reduce vehicle emissions, a principle source of urban pollution (Hayes 2018, Longhurst et al 2016). However, less attention has been paid to the important role of local authority planning processes which determine the pattern of housing and commercial development and subsequent air quality implications.

The relationship between planning and health has historical roots with early planning initiatives playing a critical role in protecting people's health through improved air quality, drinking water, rubbish removal, land use and tenement housing reforms (Arthurson et al 2016:5). Over the years interest in utilising planning powers to control pollution problems has waxed and waned (Miller and Wood 2007:597). More recent concern about environmental issues in planning and development policies emerged in the 1970s, subsequently strengthened by increasing environmental regulation following the UK joining the European Community. While the current context is somewhat different than a century ago planning still plays an important role (Carmichael et al 2019). As Khreis et al (2017) argue:

... if current urban and transport planning practices are responsible for a substantial but modifiable burden of disease, then improved practices within both fields could lead to new solutions for creating healthier and more sustainable communities (60).

The link between poor air quality and health lead to earlier efforts to regulate pollution such as the Clean Air Act 1956 introduced in response to the London smog of the 1950s. More recently interest has focused on NO<sub>2</sub> and particulate matter (PM) – especially from the use of fossil fuels and vehicle transport in particular (Longhurst et al 2016). Public Health England (PHE) and the National Institute for Health and Care Excellence (NICE) have highlighted the health impacts of air pollution providing evidence of both short-term roadside and longer term exposure on the burden of disease and mortality (NICE 2017, NICE 2019, PHE 2018). More importantly, the evidence of the impact of fairly low levels of pollutants on human health is widely accepted with the World Health Organisation (WHO) and others highlighting the significant adverse effects world-wide (Landrigan et al 2018). Daily exposures to PM are associated with both mortality and morbidity at levels significantly below current UK limits (See figure 1) with children and older people being particularly at risk, and short-term exposure can lead to adverse physiological changes in the respiratory and cardiovascular systems and contribute to the burden of non-communicable diseases including cancer, diabetes and possibly dementia [WHO 2013, Landrigan et al 2018, Williams 2019]. The relevance of development and transportation planning to improving air quality and reducing adverse health effects is widely recognised (NICE 2017, 2019, PHE 2019a). The issue is of heightened interest given emerging evidence linking ambient air pollution with increased mortality from Coronavirus (Ogen 2020, Travaglio et al 2020). The UK Department of Environment, Food and Rural Affairs (DEFRA) has called for additional research into this issue and APPGAP has called for additional government support to improve air quality as the UK moves out of lock-down with an emphasis on transport planning and improved environments (APPGAP 2020).

FIGURE 1 ABOUT HERE

In the UK planning is a devolved function with different systems operating in England, Northern Ireland, Scotland and Wales. This discussion here focuses on England. The legal framework for air quality (AQ) assessment is the same in England and Wales and air quality objective limits are similar across the UK, except in Scotland where the PM<sub>2.5</sub> limit is the WHO limit - lower than in the rest of the UK. Planning policy and decisions at the local government level are guided by the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government (MHCLG) 2019). Local planning authorities (LPAs) must adequately consider air quality impacts of development on population health. However, the NPPF is simply a guide and LPAs balance these requirements against other national policy,

guidelines and local priorities. There is reference in planning guidance to policy governing air quality management – particularly in relation to areas covered by Air Quality Management Areas (AQMAs) where NO<sub>2</sub> or PM exceed national limits. However, the regulatory frameworks covering air quality management and planning decisions are separate with responsibilities split between different departments at both central and local government levels. Local government also has statutory powers related to the health and wellbeing of local residents. The Local Government Act 2000 (the ‘2000 Act’) allows principal local authorities in England and Wales to promote the economic, social and environmental well-being of their area (‘the Well-Being Power’) which includes the promotion or improvement of the health of residents and visitors.

Planning policies and decisions should generally sustain compliance with, and contribute towards, meeting national objectives for air pollutants with EU Directive limits currently retained even though the UK has now left the EU. Planning policies and decisions should also ensure that new developments in an AQMA are consistent with the local Air Quality Action Plan (AQAP) and that “Opportunities to improve air quality or mitigate impacts should be identified ...” (NPPF 2019: para 181). Air quality (AQ) assessment is a key part of the impact assessment for local plans and major planning applications. In some countries (e.g. Netherlands, USA and New Zealand), a more formal Health Impact Assessment (HIA) is often required (Fischer et al 2010). An HIA is rarely requested by UK LPAs although the Welsh Government has more actively promoted their use. However, even where these are undertaken there is little evidence of their impact (Chadderton et al 2013, Den Broeder et al 2017).

Recent changes in guidance for environmental impact assessment (EIA) have placed more significance on the responsibility of developers to assess direct and indirect effects on “population and human health”, including the risk from poor air quality (MHCLG 2017). The significance has been heightened by increasing evidence of the health problems associated with air pollution, particularly road transport (Barnes et al 2019). EIAs should also detail monitoring, enforcement and mitigation to ensure development impacts outlined in the EIA are fulfilled (MHCLG 2017). National guidelines and policy on air quality are the responsibility of DEFRA while planning and the application of environmental assessment is the responsibility

of MHCLG. Sub-nationally, local government has responsibility for air quality measurement and is the planning decision-making authority. This division of responsibility creates a weakness in ensuring air quality objectives are met (Barnes et al 2018).

This aim of this paper is to explore the degree to which air quality, and its health impact, is considered by LPA during the decision process. It provides an overview of current guidance and legal frameworks governing AQ assessment and how the impact of air quality is considered in local planning processes. The paper then discusses a number of examples where air quality has emerged as a key issue. The cases referred to are used primarily as illustrative examples and have been selected either due to personal involvement in the cases, identified in environmental and air quality news alerts (such as ENDS Reports) and reference to planning appeal decisions. The author was directly involved as expert witness in two cases referred to – *Gladman v SSHCLG & CPRE (2017)* and *R(Shirley) v SSHCLG (2019)*, and also supporting local groups in some of the other planning cases discussed here. The paper only highlights aspects related to AQ assessment to illustrate how air quality, and public health impacts are considered in the planning process drawing on evidence from AQ assessment, planning officer and planning inspector reports. The paper concludes by exploring the implications for future planning decisions and whether current EIA and AQ assessment frameworks provide adequate guidance and power to LPAs on AQ assessment and health impacts.

### **Air Quality Management and the current legal framework**

In the UK, action to manage and improve air quality has been largely underpinned by the EU 2008 Ambient Air Quality Directive that sets limits for concentrations in outdoor air pollutants that impact public health such as PM<sub>10</sub> and PM<sub>2.5</sub>, NO<sub>2</sub> and low level ozone (O<sub>3</sub>). These were incorporated into Environment Act 1995 and subsequent amendments that require local authorities to review the air quality within its area (Section 82) and to designate an AQMA where air quality objectives (See figure 1) are not being, or may not be, achieved (Section 83). Responsibility for meeting the Directive is a national government one as highlighted in *(R(ClientEarth(3)) v SSEFRA (2018)*. The future compliance framework now the UK has left the EU is not yet clear. Currently proposals in the Environment Bill retain EU Directive levels but no new targets have been set despite indications in the Clean Air Strategy

(DEFRA 2019a). However, the Secretary of State will be required to set air quality targets with a specific requirement for PM<sub>2.5</sub> (Environment Bill Part 1, Chapter 1).

AQMAs have a specific relevance in planning guidance as LPAs must consider whether local plans and developments would have a negative impact on these areas. Once an AQMA has been designated, a local authority is required to develop an AQAP detailing remedial measures to be implemented where national objectives are not met, or are at risk of not being met. Producing an AQAP is currently the only legally required commitment, local authorities are not required to demonstrate that they have, or will, achieve compliance with national limits. Currently it is unclear whether local authorities can be held responsible for failing to meet the target limits set out in the EU Directive as it is solely the duty of the Secretary of State to ensure compliance (Barnes et al 2018).

Local authorities with declared AQMAs are required to submit annual status reports (ASRs) to DEFRA detailing local monitoring and actions being taken to achieve compliance with national objectives. These are assessed for content compliance by DEFRA which may give feedback to local authorities, but only “... to give local authority further guidance on the content of their Action Plan” not on the effectiveness or achievability of the plan (DEFRA correspondence 7<sup>th</sup> January 2019b). Until 2018, DEFRA had not required any local authority to amend their plans with recent directions to 38 cities only arising as a result of legal action challenging the government’s air quality action plan (R(Client Earth(3) v SSEFRA 2018). Problems associated with this process have been extensively discussed elsewhere (Barnes et al 2018). This is despite the fact that there are currently over 600 AQMAs in place across hundreds of local authorities where NO<sub>2</sub> or PM<sub>10</sub> exceed national limits values (DEFRA 2020). This also underrepresents the actual number of places where air quality limits are exceeded as monitoring only takes place where local authorities determine there is a need, not everywhere where there are exceedances (Marsh 2017). The location of monitoring has important implications for AQ assessment in planning decisions, as will be illustrated later in this paper. Under current legislation the remedy at a local government level remains simply to have an AQAP in place, rather than a duty to ensure that limit values are not exceeded. The Government’s Clean Air Strategy (DEFRA 2019a) proposed that the duty to meet limit values

would be strengthened but this has, like promised new PM<sub>2.5</sub> limits, not been included in the Environment Bill.

### **Planning policy framework for AQ assessments**

LPAs in the UK (District, Unitary and County Councils) are responsible for strategic planning policy through Local Development Plans which are primarily spatial allocation plans but also set out core planning policies, and planning decisions on individual development proposals. The actual process and responsibilities vary between the different constituent countries of the UK and the focus here is more specifically related to England. Environmental assessments and assessing air quality are relevant to both areas of responsibility but governed by separate guidance and with differing emphases.

For Local Development Plans, LPAs have been required since 2001 undertake a Sustainability Assessment which incorporates a strategic environmental assessment (SEA) including assessing the impact on health (MHCLG 2019). In contrast a health assessment was not required in the EIA until 2017. However, while the inclusion of health in both the SEA and EIA has been widely welcomed by public health professionals, in practice it is not clear how involved they have been in local plan making or in major development assessments (TCPA 2019).

In the UK, LPAs determine most development applications. Appeals and national strategic developments are determined by the Secretary of State for Housing, Communities and Local Government (SSHCLG). Air quality planning guidance requires LPAs to achieve a balance between economic, social and environmental considerations including considering potential impact of new development on air quality (MHCLG 2019). Particular attention must be paid to complying with national air quality objectives and EU Directives, local AQAPs and strategies, any degradation (or improvement) in local air quality and whether the development will introduce new public exposure into an area of existing poor air quality.

Air quality is a material consideration in planning decisions and must be given due weight when determining an application as set out in the NPPF and the EIA regulations (MHCLG 2017,

MHCLG 2019). Only larger residential and commercial developments are likely to impact air quality due to increased emissions created by the developments. In such cases an AQ assessment is normally required as part of the EIA (MHCLG 2017). The main source of pollution is usually from vehicle emissions due to increased traffic levels (NO<sub>2</sub> and PM). Planning regulations set out the specific circumstances about what types of development require an EIA, but leaves the detail of what is included rather vague and LPAs determine when an EIA is required and what should be included. Most assessments refer to guidance from the Institute of Air Quality Management (IAQM) & Environmental Protection UK (EPUK) (2017) which provides threshold criteria for establishing when significant impacts on local air quality may occur and when a detailed assessment of potential impacts is required.

FIGURE 2 HERE

Failure to include appropriate information on air quality could result in an invalid application or in the application being refused or delayed (Arabadjieva 2017). LPAs need to identify, describe and assess in an appropriate manner, the direct and indirect significant effects of the proposed development on population and human health (4(a)). MHCLG publishes planning guidance on air quality, although the provisions are quite general (MHCLG 2019 Paragraph: 005 Reference ID: 32-005-2019). How air quality is assessed within EIAs varies. Most assessments utilise DEFRA modelling tools and IAQM and/or local planning guidance to calculate levels of pollutants – especially in the absence of local air quality monitoring - as well as calculating the potential impact of development on air quality at a future date.

With growing concerns about air quality in the UK, the latest revision to the NPPF (MHCLG 2019) has both directly and indirectly placed greater emphasis on considering air quality and its impact on population health. Previously the NPPF simply required compliance with national air quality objectives, impacts on AQMAs and compliance with AQAPs. As Barnes et al (2018) noted “... air quality considerations rarely carry sufficient weight in development control decisions, even where developments are expected to lead to a worsening of public health, ...” (36).



The reasons for this included a presumption of development within the NPPF explicitly stating that the presence of an AQMA should not necessarily preclude development and Government policy that has prioritised house building and other development. This invariably meant that protection of public health was seen to be in opposition to national priorities for growth and ambitions for economic development. (Barnes et al 2018: 36)

The current NPPF (MHCLG 2019) places more emphasis on air quality impacts so that as well as taking account of AQMAs and, where existing, Clean Air Zones (Para 181), LPAs should seek: "... to improve air quality or mitigate impacts ..." (Para 181). It also links air quality issues to vehicle emissions with authorities having to ensure that "... environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for providing mitigation (Para 202(d)). The NPPF also encourages development in locations that are or can be made sustainable to help to reduce congestion and emissions and improve air quality and public health (Para 103).

However, planning law is complex and the NPPF lacks any formal legal status. For example, in a case that was eventually heard in the Supreme Court (Suffolk Coastal DC v Hopkins Homes 2017), the ruling stressed that the NPPF is no more than guidance and cannot 'displace the primacy' of a statutory development plan. The NPPF is clear that planning decisions will involve a balanced decision between different negative and positive outcomes. There is significant emphasis on meeting housing supply targets and supporting economic development or meeting housing allocation targets tend to carry more weight than consideration of issues such as air quality (e.g. Lambeth Borough Council 2019).

In fact the NPPF explicitly refers to three mutually important, interdependent, overarching objectives to achieve net economic, social and environmental gains (NPPF 2019:para 8). However, environmental and health impacts are given less priority with the NPPF emphasising that " Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development" (NPPF 2019:para 80).

The NPPF provisions are supported by several guidance documents. EIA guidelines in England reflect the increasing relevance of ensuring that development minimises human health impacts. DEFRA provides a number of modelling tools for calculating emissions and damage cost estimates to air quality impacts. However, application of these models relies on the availability of air quality data which is not always available leading to potentially different interpretations of air quality impacts (Mills and Peckham 2019). There is also a range of professional body guidance from the Royal Institute of Town Planning, IAQM and EPUK. There is also guidance to promote active transport and modal shift, sustainability and support for reducing diesel vehicles and promoting electric cars, taxis and buses (NICE 2017, NICE 2019, PHE 2019). Locally areas that have particular air quality problems, such as those with declared AQMAs or low emission zones are developing stricter guidelines drawing on this wider policy and guidance.

Currently, general planning and air quality management frameworks guiding local authority planning decisions lack clarity and do not provide sufficient guidance to LPAs about how they should assess the negative impacts of air quality arising from developments in relation to health. Guidance focuses on whether developments comply with national air quality objectives with little attention to health. LPAs can refuse permission, grant with conditions, that may include mitigation to reduce detrimental air quality effects (including an economic cost calculation and various actions aimed at reducing emissions), or require further monitoring but without clear criteria about how, if at all, these should be determined and applied.

### **Application of air quality issues in recent planning decisions**

The following examples discuss illustrative cases where air quality has been a significant planning issue. They provide examples of how air quality is considered in planning decisions and what weight and conditions are applied in practice. In particular, they highlight how decisions regarding air quality rest on assessment against national air quality objectives for NO<sub>2</sub>, and PM<sub>2.5</sub> and PM<sub>10</sub> as determined at specific locations and overall damage cost mitigation calculations and ignore the wider evidence on health impacts on populations.

Local objections to a housing scheme in Hassocks, West Sussex included concerns expressed about a negative impact on air quality, leading to permission being refused. An appeal was initially dismissed by a Planning Inspector in 2015 when a successful argument by those opposing that the development that it would have a detrimental effect on a nearby AQMA as the AQ assessment did not take into account uncertainty about the future impact of emissions from diesel vehicles. This was at the time of the VW scandal involving questions about whether actual on-road emissions really conformed to Euro 6 guidance. On appeal to the High Court the Inspector's decision was quashed due to an error by the Inspector for accepting this evidence despite having accepted that it was not grounded in fact. The developer resubmitted the application with a revised AQ assessment that demonstrated that NO<sub>2</sub> would stay within national limits. On the basis of this assessment the Planning Inspector concluded that the proposal did not breach local or national air quality policies arguing that "... the proposal would not impede the improvement in air quality within the AQMA sought by the action plan in this case having regard to the contribution by way of planning obligation to be made towards implementing its measures" (APP/D3830/W/14/2226987 2017:Para 25). The inspector noted that the Council had already agreed that developer's approach to assessment was appropriate and that, as such, the air quality impact of the scheme would have an insignificant effect on health. This demonstrates how national limits are used as a proxy for assessing health impact. This is a routine approach in AQ assessment for planning decisions as will be demonstrated in the following further examples.

In Uttlesford, Essex, the health impact of air quality was explicitly referred to as a reason for refusal because "The proposal by reason of its size and scale would give rise to unacceptable levels of air quality within Newport which can have a harmful impact on human health ..." (UDC Decision notice May 17, 2017). The developer appealed and submitted a revised AQ assessment that demonstrated that the development would comply with national AQ objectives. The revised AQ assessment made explicit reference to council policies regarding development *not leading to significant adverse effects on health* (Air Quality Consultants 2019:9) The assessment also referred to the fact that the Government has established air quality standards and objectives to protect human health set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. The AQ assessment is interesting as it explicitly refers to IAQM guidance

that guidance recommends that the assessment of significance should be based on professional judgement and that:

the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals. ... A judgement of the significance should be made by a competent professional who is suitably qualified. (Air Quality Consultants 2019:90).

But judgement about the significance is rarely, if ever, made by a health professional. Normally judgement is made by the air quality consultants and planning officers. In this case the planning inspector judged that the proposal wouldn't give rise to unacceptable levels of air quality that would harm human health ( Appeal Decision APP/C1570/W/18/3209655: para 79). These cases appear to have placed greater weight on the national annual objectives, not on whether additional emissions would be harmful to population health. This is particularly explicit in an AQ assessment for another proposed development which made extensive references to the impact on human health and where the final environment statement refers to "health-based air quality objectives" (Savills 2019:para 6.8.4). Again, even though reference is made to human health there is no reference to any health professional of recent evidence on the impacts of air pollution on health.

Yet even when potential health impacts are recognised these tend not to be considered critical. For example, in 2019 Lewisham Council in London granted permission for a block of 56 flats within an AQMA despite an adverse AQ assessment and in a location with an annual average concentration of  $56.3\mu\text{g}/\text{m}^3$  micrograms of  $\text{NO}_2$  – substantially higher than the national limit of  $40\mu\text{g}/\text{m}^3$ . The developer's AQ assessment made a number of references to national and Greater London Authority (GLA) policies regarding the impact of AQ on health but primarily in relation to ensuring reductions/mitigation for construction and demolition but not on occupation (Arden 2018). Arden's AQ assessment does recommend measures to reduce resident's exposure by keeping windows closed to lower exposure to traffic pollution

(para 7.10). The planning officer described air quality as “a low priority” but that a planning obligation be made to ensure that residents of the lower three floor levels were provided with information about the potential air pollution risks to human health (Lewisham Borough Council 2019). In contrast to the little consideration given to air quality, the officer’s report placed significant weight to the development contributing 56 homes to Lewisham’s housing target of 1,131 dwellings. While the GLA refused, it was not on AQ or health grounds despite the fact that the London Plan Policy 7.14 emphasising “...*the importance of tackling air pollution and improving air quality to London’s development and the health and well-being of its people.*” (GLA 2016).

In another recent example, the LPA granted permission for a major development “Anglia Square” in Norwich despite the fact that the impact on air quality in the AQMA would be negative meaning that the AQMA would continue to breach national. This was despite a public health report which, while not placing significant objections, was concerned that:

... modelling of both current use and post-development use of the site indicates a number of locations which would fail to meet existing, never mind reduce current levels of, air quality standards in terms of NO<sub>2</sub> and also fall above current recommended WHO measures for PM10. In some cases the modelling suggests NO<sub>2</sub> levels may exceed hourly as well as annual mean figures. These hourly exceedances represent potential risks to people who may work or shop in the area as well as pedestrians, cyclists and drivers. (Norfolk County Council Public Health 2018)

The planning officer’s report referred to the public health officer’s concerns and that it was accepted that pollution levels would remain above national limits in the vicinity of the development, including hourly exceedances. However, as the council’s environment health officer was satisfied that pollutant concentrations in proposed public amenity areas in the development would not exceed relevant statutory targets approval was recommended (Norwich City Council Planning Officer report 2018: para 522).

The application was “called in” by the Secretary of State for MHCLG and a planning inquiry was held in early 2020. The proposal is opposed by a number of local groups with air quality

one of the major areas of concern. The AQ assessment for the developer was undertaken by Aether Ltd referred explicitly to the potential adverse health effects of NO<sub>2</sub> and PM<sub>10</sub> and refers to the health evidence by the Committee on the Medical Effects of Air Pollutants (Aether Ltd 2018:9). However, this is the only reference in the assessment to health as the rest only refers to national air quality limits. These examples suggest that there is a disconnect between acknowledging that there are significant health impacts from poor air quality and the lack of discussion or review of relevant health evidence. The approach appears to be standard and wide spread with the same wording repeated in a later assessment (Aether 2019) although in this latter case in Redbridge (London), there is some additional attention paid to the impact of construction dust. Interestingly neither AQ assessment in Lewisham or Norwich included an analysis of impacts on PM<sub>2.5</sub> despite this pollutant having significant adverse health impacts.

Problems of measurement of air quality impacts and how these are viewed in the planning process is well illustrated by an appeal case in Kent. Here a developer appealed against non-decision and subsequent refusal for a development that did not conform to the Local Development Plan. One of the grounds for refusal was on air quality. The AQ assessment submitted with the development argued that the development of 675 houses, school and rugby pitches on a greenfield site bordering Sittingbourne would have a positive impact on air quality despite the development contributing an additional 1.5 million additional vehicle movements and some 2.5 tonnes of NO<sub>2</sub> and PM<sub>2.5</sub> each year (Entran Ltd 2017). The argument was based on building a new road through the proposed development removing some traffic from an existing congested A road. The case raises the issue of whether simply redistributing pollution so that no selected receptor locations breached national objective limits means that the air quality impact is beneficial even if the site generates additional levels of pollution. Mitigation proposals relied heavily on including EV points, landscaping, highways improvements and a travel plan was subsequently shown as having minimal impact on reducing pollution levels over a five-year period (Entran Ltd 2017). There was no existing local pollution monitoring, so all assessments were based on modelling of traffic and emissions which, the developer claimed redistributed pollution from an area that potentially exceeds national limits to an area with low pollution levels – ironically because it was currently a

greenfield site. This case also demonstrates how AQ assessments simply equate national limits as setting health safety limits:

The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence ... These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects. (Entran 2017: para 8.52)

Even putting the wealth of evidence that clearly shows the standards are not protective of health to one side, the Entran also referred to lower WHO limits - which are lower than UK limits for PM. Yet, the assessment then completely ignores these even though their modelling shows that levels of PM will exceed them – and therefore, presumably be damaging to human health.

Interestingly in this case local monitoring by opponents led to additional subsequent local authority monitoring identifying an area that exceeded national objective limits for NO<sub>2</sub>. Had this been previously identified and registered as an AQMA under current planning guidelines it would have had more significance in the determination of the application. Also of interest is that if only the national objective limits are considered as relevant this would give preference to schemes in green areas where current background pollution levels are low, compared to urban areas where there may already be locations near to or above national limits. The final decision is awaiting the outcome of a Planning Inspector Inquiry (Ref APP/V2255/W/19/3233606).

Until 2019, developers were only required to provide mitigation outlined in DEFRA and local guidance funded through damage costs calculated using DEFRA guidance (Birchby et al 2019). Generally, mitigation has included measures to promote modal shift, provision of EV points and provision of green space/landscaping. Until recently, there was no requirement for developers to demonstrate that mitigation would actually reduce the level of emissions. However, in November 2019 MHCLG guidance changed as the result of an Appeal Court ruling in *Gladman v SSHCLG* (2019), upholding an inspector's decision regarding AQ assessment. In

2017, Gladman Developments Ltd appealed the refusal of planning permission. The Inspector dismissed the appeal on a number of grounds including the impact on air quality following representation from the Kent Campaign to Protect Rural England (CPRE). The CPRE argued that the development would contribute to continued breaches of the national limits in an AQMA and that the developer had not provided adequate mitigation that clearly demonstrated that it would reduce pollution levels resulting from the development. The developer appealed to the High Court (*Gladman v SSHCLG* 2017) which upheld the inspector's decision arguing that the developer could not rely on the assumption that the UK would comply with its Directive obligations by 2020 (which has not). The developer appealed but in dismissing the appeal the judges' ruling made clear that any mitigation proposed by a developer must demonstrate that it will have the effect of reducing pollution arising from the development (*Gladman v SSHCLG* 2019). As a result it is now not sufficient to make general statements about mitigation – it “must be real” and demonstrable in terms of the impact on pollution levels. Neither can developers rely on this being the responsibility of other bodies such as DEFRA or local authorities. As a result of the ruling planning guidance on air quality was updated by MHCLG in November 2019 so that “Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact...” and that mitigation is appropriate “... to ensure new development is appropriate for its location and unacceptable risks are prevented.”(MHCLG 2019). Interestingly, the power to ensure that mitigation is an outcome rather than just as a means has always been available to LPAs in determining applications and compliance can be a planning condition but in the cases reviewed above, actual achievement of reductions was not made a planning condition. Generally planning decisions focus on whether national air quality limits are breached and mitigation is accepted if it complies with cost calculations and mitigation guidance (*Birchby et al* 2019, MHCLG 2019). Generally, AQ assessments do not address any evidence on health impacts and some do not include PM<sub>2.5</sub>, in their assessments.

In another case the a judicial review (JR) was brought against the SSHCLG for not exercising his discretion to call in a planning decision where the development would lead to adverse impacts on an AQMA as it was contrary to the NPPF as it did not “... contribute to conserving and enhancing the natural environment and reducing pollution” (NPPF 2012: 17). In *R(Shirley) v SSHCLG* (2019), the court was asked to consider the extent to which the SSHCLG was obliged



to act in order to give effect to the Air Quality Directive in relation to planning permission for a major development of 4000 houses and associated commercial and other developments in Canterbury, Kent. The planning officer's report to Planning Committee concluded that, the developer's proposed mitigation measures and a monitoring regime made the development acceptable (Canterbury City Council 2016). Campaigners argued that the assessment did not adequately address impact on the local AQMA or provide adequate mitigation (note this was prior to the Gladman case). The Secretary of State decided not to exercise his powers of call-in as he was content that this application was one that should be determined at local authority level. The JR was sought to determine whether simply having a local authority AQAP was a sufficient response to breaches of limit values and should the SSHCLG as the 'competent authority' use his call-in powers to address breaches of the air quality limits given the legal responsibility of central government to meet EU Directive.

The Court upheld the SSHCLG's decision, rejecting the appeal, a ruling subsequently upheld by the Court of Appeal in 2019. The ruling confirms that the 'specific and bespoke remedy' when it came to breaches of the Directive is the implementation of an AQAP by the local authority even if there could be breaches of the national objective targets. The court acknowledged that possible breaches of limit values may be relevant to planning decisions but that their potency as material considerations was not such that the decision-maker was obliged to refuse planning permission, nor did it require the SSHCLG to assume the decision-making responsibility. Basically, the ruling means that while central government may have legal responsibility for meeting air quality limits it is not the responsibility of the SSHCLG. This appears to create a clear distinction between planning responsibilities and those of DEFRA in relation to air quality management.

## **Discussion**

Two key points stand out from the previous discussion. The first is that there is a general acceptance that current air quality standards are protective of human health. Thus, as long as levels are below the standards then there will be no health effects and consequently meets the requirement to ensure no harmful health effect. This is clearly contrary to the significant amount of evidence that shows that human health is adversely affected at levels of pollution well below national limits. The second point is that air quality issues rarely carry any

significant weight in planning decisions even when national limits are exceeded. Despite emissions improvements and the gradual shift towards hybrid and electric vehicles, it is likely that traffic will remain the major contributor of NO<sub>2</sub> and PM for the next decade or more, especially given concerns that electric cars contribute to substantial levels of PM<sub>2.5</sub> (Timmers and Acten 2016). Calls such as that from environmental groups and the APPGAP on maintaining clean air following dramatic reductions in pollution and associated health impacts during the COVID-19 crisis lockdown in 2020 add further emphasis on ensuring we establish new regulatory frameworks and approaches to reducing air pollution (APPGAP 2020).

The problem is that current UK and EU national objective limits for key pollutants are substantially higher than levels appropriate for the protection of health. The WHO has lower maximum limits for PM which were suggested as an objective in the Clean Air Strategy (DEFRA 2019a), and already adopted in Scotland. This is not included in the Environment Bill and there is increasing evidence that even these limits are not protective of health (WHO 2013). PHE and NICE guidance highlight the health impacts of air pollution with compelling evidence of a significant impact from both short-term roadside and longer term exposure on the burden of disease and mortality and its significant health and social care costs (NICE 2017, 2019; PHE 2015, 2018). Significant associations with hospital admissions for a variety of respiratory and cardiovascular diseases (including ischaemic heart disease, cerebrovascular disease and heart failure) have been found with levels of PM below WHO limits and therefore significantly below current UK limits (WHO 2013). In particular, consideration needs to be given to the impact on more vulnerable groups such as children, older people, people with respiratory diseases especially in areas of social disadvantage which tend to be more adversely affected by poor air quality (Mueller et al 2018, Williams et al 2019). Children experience stunted lung development from annual levels of NO<sub>2</sub> of 10µg/m<sup>3</sup> (25% of the national objective limit), more children suffer asthma episodes on high pollution days compared to low pollution days and living within 50 metres of a major road can increase your risk of developing lung cancer by up to 10% (Williams et al 2019). Recent evidence from the lock-down during the COVID-19 crisis shows how the significant drops in NO<sub>2</sub> across many European countries has led to reductions in Asthma admissions with one UK study reporting significant drops of over 70% in children (Krivec et al 2020). While such evidence supports the need to reduce air pollution to improve health making objective assessments of the detrimental health impacts from increased air

quality for planning purposes would be difficult. Using the national objective limits does at least provide a standard framework but the current situation is inadequate and clearly places many people at risk. Incorporating health impacts into local AQ assessments is complex but if we are to minimise health impacts and significant health and social care costs, new assessment standards are needed. This raises important questions about how the objective limits are set, who has responsibility for ensuring such limits are met and how health impacts of air quality should be assessed.

For the immediate future, LPAs will need to continue to require air quality assessments where developments are likely to lead to increases in air pollution – particularly from vehicle emissions. The current focus on the impact on AQMAs and the annualised average objective limits means that health impacts are not adequately considered. While the IAQM guidance shown in Figure 2 provides a framework for assessing the level of impact of changes in air quality but is not linked to the health impacts of specific pollutants (IAQM 2017: Para 2.6).

In the UK, air quality monitoring is limited and tends to be confined to mainly urban pollution “hot spots” affected by substantial traffic emissions or other major pollutant source. As a result declared AQMAs under-represent the total number of areas where air quality breaches national limits – the Wises Lane development referred to earlier being a good example (Malley et al 2018, Marsh 2017). Much development, especially on urban fringes or in rural areas will not have local air quality monitoring. Without actual monitoring reliance on extrapolated levels of pollutants based on complex modelling may mean decisions are based on inaccurate data, especially from diffusion tubes and/or annualised data (Malley et al 2018, Mills and Peckham 2019). The lack of local short-term exposure data is a particular problem given the evidence on adverse health impacts from short-term exposure to NO<sub>2</sub>, O<sub>3</sub> and PM (WHO 2013, Liu et al 2019).

As demonstrated in *R(Shirley) v SSHCLG (2019)*, the differing legislative frameworks for planning and air quality and different legal responsibilities for central and local government, result in significant weaknesses for the protection of public health. While central government is required to ensure national objective limits are met, it has essentially placed responsibility on local government to monitor air quality and propose actions to reduce excessive air

pollution. While they have to declare AQMAs where relevant the only remedy is still only to have an action plan – not demonstrate reductions to meet national objectives. They are also only required to monitor and address national objectives for NO<sub>2</sub> and PM<sub>10</sub>. In planning decisions, it is these objectives that have most significance and even these do not necessarily provide grounds for planning refusal. Furthermore, if decisions are then challenged, there is no responsibility for the SSHCLG to take responsibility as the representative of the Government to ensure compliance. Also, while there are national objective limits for O<sub>3</sub> and PM<sub>2.5</sub> there is currently no legal requirement for local authorities to monitor these, take any required actions or consider these in planning decisions despite their significant adverse health impacts.

While EIAs cover environmental as well as health issues the regulatory framework is weak in terms of protecting public health and inclusion of an HIA is rare. An exception is in Bristol which has a development management policy requiring an HIA for developments likely to have a significant impact on health and wellbeing (Carmichael et al 2016). LPAs and developers focus on whether estimated air pollution impacts simply meet national UK air quality limits. Rarely is there a reference to health impacts in AQ assessments and where they do, contrary to the evidence, it is assumed that achieving national limits means there is no health impact.

Guidance published by the Town and Country Planning Association (TCPA - 2015) highlights air quality as one area where public health services and professionals should influence planning decisions. Interestingly, apart from the Norwich example, in all the cases highlighted above, there was no involvement of public health. In fact LPAs, rarely work with public health professionals or even environmental health colleagues (TCPA 2019).

Legal cases such as R(ClientEarth(3)) v SSEFRA (2018), where the Court heavily criticised the English 2015 Air Quality Plan for making overly optimistic projections of future compliance with limit values, and the ruling in Gladman v SSHCLG (2019), appear to give weight for a legal test to ensure that measures chosen to tackle air pollution must make compliance not just possible, but likely. However, LPAs tend to give less weight to air quality issues or accept that modelling indicating future levels fall within annual directive objectives provides sufficient

health protection. Consideration of the evidence on health impacts is simply ignored or not considered relevant and rarely explicitly referred to. While the application of evidence of health impacts is complex there are some approaches that may provide a framework for placing greater consideration on health impacts in AQ assessments. With poor air quality identified as a major contributor to morbidity and mortality world-wide – accounting for some 6.5 million deaths each year and expected to increase by 50% by 2050 developing clearer health related assessments for adverse air quality impact on human health is clearly of international importance (Landrigan et al 2018).

There are two potential approaches which appear to be viable. The first is to follow the logic of the Gladman ruling and the London Plan to ensure that developments are air quality neutral. As such mitigation proposals should be shown to negate all potential increases in pollution that would be generated by the development. This would require some agreement about monitoring and modelling. Large developments where AQ assessments are required should undertake pre-application monitoring at agreed locations that provide hourly and daily levels – not just monthly averages. There should also be a planning condition applied that requires additional mitigation contributions if air quality deteriorates post development.

The second approach would be to apply a public health cost consideration based on the recently published report by PHE (2019b). This provides a way of calculating the economic burden of pollution in  $1\mu\text{g}/\text{m}^3$  increments per 100,000 population providing some estimate of impact. In addition, PHE modelling also provides estimates of early mortality for adults by area and a report from Kings College London provide a comprehensive assessment of localised impacts (PHE 2014, Williams et al 2019). This could be used to inform a stricter “pathways approach” to determining the potential health impacts of air quality from new developments They provide a way of quantifying the significance of pollutant levels for planning decisions compared with using the annual national average objective limits. Such an approach could be set out in the Local Development Plan which has a five-year review cycle allowing revisions of the assessment criteria based on current health assessments incorporated into the SEA.

## **Conclusion**

When assessing air quality implications of development LPAs should adopt the most rigorous and up-to-date emissions factors and dispersion models to estimate future compliance scenarios and conservative estimates and, where feasible, always insist on pre-development real-time monitoring. With the development of cheap accurate air quality monitors such measurement is becoming a reality. This needs to be linked to a more realistic assessment of the potential health impacts based on emerging evidence on health impacts. In relation to mitigation and minimising health impacts a more stringent pathways to impact mitigation model based on current health research would be valuable and feasible. Current guidelines on assessing air quality, which focus on long-term effects, are simply inadequate to protect human health. To meet their duties to protect and promote human health LPAs need improved assessment of the health impacts, and health and social care costs, of any deterioration in air quality due to development. Using Local Development Plans to set clear impact criteria would be helpful for this. Ultimately new Government objective limits for air pollutants may be developed – particularly as the governance of air quality shifts from the EU to the UK, but we lack details of this and to date proposals by the government in draft legislation have not included new lower limits.

## References:

AETHER LTD (2018) *Air quality assessment for the proposed Development at Anglia Square*. Norwich Oxford: Aether Ltd

AETHER LTD (2019) *Air Quality Assessment Chapter 4* in Terence O'Rourke Ltd Vol 1 Goodmayes Environmental Assessment.

ARABADJIEVA, K (2017) Vagueness and Discretion in the Scope of the EIA Directive. *Journal of Environmental Law*, 29:417-444.

ARDENT CONSULTING ENGINEERS (2018) *1 Creekside, Deptford London Air Quality Assessment Report Ref. 163690-05*

ARTHURSON, K., LAWLESS, A. AND HAMMET, K. (2016) Urban planning and health: Revitalising the alliance. *Urban Policy and Research*, 34:4-16.

BARNES, J.H., HAYES, E.T., CHATTERTON, T.J. AND LONGHURST, J.W.S. (2018) Policy disconnect: A critical review of UK air quality policy in relation to EU and LAQM responsibilities over the last 20 years. *Environmental science & policy*, 85:28-39

BARNES, J.H., CHATTERTON, T.J. AND LONGHURST, J.W. (2019) Emissions vs exposure: Increasing injustice from road traffic-related air pollution in the United Kingdom. *Transportation Research Part D: Transport and Environment*, 73:56-66.

BEATTIE, C. I., LONGHURST, J. W. S. & WOODFIELD, N. K. (2001) Air quality management: evolution of policy and practice in the UK as exemplified by the experience of English local government, *Atmospheric Environment*, 35:1479–1490.

BEATTIE, C.I., LONGHURST, J.W.S. AND ELSOM, D.M. (2004) Evidence of integration of air quality management in the decision-making processes and procedures of English local government. *Local environment*, 9:255-270.

BIRCHBY B, STEDMAN A, WHITING S AND VEDRENNE M (2019) *Air Quality damage cost update 2019* Report for Defra AQ0650 ED 59323 | Issue Number 2.0 | Date 27/02/2019  
London: Ricardo Energy and Environment.

DEN BROEDER, L., UITERS, E., TEN HAVE, W., WAGEMAKERS, A. AND SCHUIT, A.J. (2017) Community participation in Health Impact Assessment. A scoping review of the literature. *Environmental Impact Assessment Review*, 66:33-42.

BRUNT, H., BARNES, J., LONGHURST, J.W.S., SCALLY, G. AND HAYES, E. (2016) Local Air Quality Management policy and practice in the UK: the case for greater Public Health integration and engagement. *Environmental Science & Policy*, 58:52-60.

CANTERBURY CITY COUNCIL (2017) *Planning Officer's Report Application No. Ca/16/00600/Out*. 13 December 2016.

CARMICHAEL, L., LOCK, K., SWEETING, D., TOWNSHEND, T. AND FISCHER, T.B. (2016) Evidence base for health and planning—lessons from an ESRC seminar series. *Town and Country Planning*, 85:461-464.

CHADDERTON, C., ELLIOTT, E., HACKING, N., SHEPHERD, M. AND WILLIAMS, G. (2013) Health impact assessment in the UK planning system *Health Promotion International*, 28:533-543.

COWELL, R. 2017. The EU referendum, planning and the environment: where now for the UK? *Town Planning Review*, 88:153-171.

DEFRA (DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS), PUBLIC HEALTH ENGLAND AND THE LOCAL GOVERNMENT ASSOCIATION (2017) *Air Quality A Briefing for Directors of Public Health* London: DEFRA.

DEFRA (2019a) *Clean Air Strategy 2019a*. London: DEFRA.

DEFRA (2019b) FOI response 7<sup>th</sup> January 2019



[https://www.whatdotheyknow.com/request/how\\_are\\_local\\_authority\\_air\\_qual#incoming-1280118](https://www.whatdotheyknow.com/request/how_are_local_authority_air_qual#incoming-1280118) Accessed 11<sup>th</sup> January 2019.

DEFRA (2020) Summary AQMA data. <https://uk-air.defra.gov.uk/aqma/summary> Accessed 15 June 2020.

DEPARTMENT FOR TRANSPORT (2018) *The Road to Zero Next steps towards cleaner road transport and delivering our Industrial Strategy* London: Department for Transport.

ENTRAN LTD (2017) - *Wises Lane Sittingbourne Environmental Statement: Volume 1, Main Text (Chapter 8)* Sept 2017.

FISCHER, T. B.; MARTUZZI, M. AND NOWACKI, J. (2010) The consideration of health in SEA *EIA review*; 30:200-210.

GLADMAN DEVELOPMENTS LTD V SSCLG & CPRE (KENT) [2017] EWHC 2768

GLADMAN DEVELOPMENTS LTD V SSCLG & CPRE (KENT) [2019] EWCA CIV 1543

GREATER LONDON AUTHORITY (2016) *The London Plan. The Spatial Development Strategy for London. Consolidated with Alterations.* March 2016

HAYES, E. (2018) Evolution of Air Quality Policy and Management in Urban Areas. *Urban Pollution: Science and Management*, in Charlesworth S and Booth C *Urban Pollution* 29-37. John Wiley.

IAQM (INSTITUTE OF AIR QUALITY MANAGEMENT) AND ENVIRONMENTAL PROTECTION UK (2017) *Land-Use Planning & Development Control: Planning For Air Quality* IAQM/EPUK January 2017.

KHREIS, H., VAN NUNEN, E., MUELLER, N., ZANDIEH, R. AND NIEUWENHUIJSEN, M.J. (2017) How to create healthy environments in cities: commentary. *Epidemiology*, 28:60-62.

KRIVEC U, KOFOL SELIGER A, TURSIC J. (2020) COVID-19 lockdown dropped the rate of paediatric asthma admissions *Arch Dis Child* Epub ahead of print: [22 May 2020]. doi:10.1136/archdischild-2020-319522

LANDRIGAN, P.J., FULLER, R., ACOSTA, N.J., ADEYI, O., ARNOLD, R., BALDÉ, A.B., BERTOLLINI, R., BOSE-O'REILLY, S., BOUFFORD, J.I., BREYSSE, P.N. AND CHILES, T. (2018) The Lancet Commission on pollution and health. *The lancet*, 391(10119), pp.462-512

LEWISHAM BOROUGH COUNCIL (2019) *Planning Officer's report to Strategic Planning Committee on application DC/18/106708* 26<sup>th</sup> March 2019

LIU, C., CHEN, R., SERA, F., VICEDO-CABRERA, A.M., GUO, Y., TONG, S., COELHO, M.S., SALDIVA, P.H., LAVIGNE, E., MATUS, P. AND VALDES ORTEGA, N. (2019) Ambient particulate air pollution and daily mortality in 652 cities. *New England Journal of Medicine*, 381:705-715.

LONGHURST, J.W.S., BARNES, J.H., CHATTERTON, T.J., HAYES, E.T. AND WILLIAMS, W.B. (2016) Progress with air quality management in the 60 years since the UK clean air act, 1956. Lessons, failures, challenges and opportunities. *International Journal of Sustainable Development and Planning*, 11:491-499.

MALLEY, C.S., SCHNEIDEMESSER, E.V., MOLLER, S., BRABAN, C.F., HICKS, W.K. AND HEAL, M.R. (2018) Analysis of the distributions of hourly NO<sub>2</sub> concentrations contributing to annual average NO<sub>2</sub> concentrations across the European monitoring network between 2000 and 2014. *Atmospheric Chemistry and Physics*, 18:3563-3587.

MARSH S (2017) UK citizens are taking air pollution monitoring into their own hands *The Guardian* 1<sup>st</sup> September 2017.

<https://www.theguardian.com/environment/2017/sep/01/uk-citizens-are-taking-air-pollution-monitoring-into-their-own-hands>. Accessed 15 June 2020.

MILLER, C. AND WOOD, C. 2007. The adaptation of UK planning and pollution control policy. *Town Planning Review*, 78:597-618.

MILLS AJ AND PECKHAM S (2019) Garbage in, gospel out? - Air quality assessment in the UK planning system *Environmental Science and Policy* 101:211-220.

MHCLG (MINISTRY OF HOUSING, COMMUNITIES AND LOCAL GOVERNMENT) (2017) *Town and Country Planning (Environmental Impact Assessment) Regulations 2017*.

MHCLG (2019) *National Planning Policy Framework*

MHCLG (2019) *Strategic environmental assessment and sustainability appraisal*. <https://www.gov.uk/guidance/strategic-environmental-assessment-and-sustainability-appraisal> Accessed 15 June 2020.

MHCLG (2019) *Planning System Guidance: Air Quality* <https://www.gov.uk/guidance/air-quality--3#what-air-quality-considerations-does-planning-need-to-address> Accessed 16 June 2020.

MUELLER, N., ROJAS-RUEDA, D., KHREIS, H., CIRACH, M., MILÀ, C., ESPINOSA, A., FORASTER, M., MCEACHAN, R.R., KELLY, B., WRIGHT, J. AND NIEUWENHUIJSEN, M. (2018) Socioeconomic inequalities in urban and transport planning related exposures and mortality: A health impact assessment study for Bradford, UK. *Environment international*, 121:931-941

NICE (NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE) (2017) *Air pollution: outdoor air quality and health* NICE guideline Published: 30 June 2017 [www.nice.org.uk/guidance/ng70](http://www.nice.org.uk/guidance/ng70)

NICE (2019) *Air pollution: outdoor air quality and health* Quality standard Published: 28 February 2019 [www.nice.org.uk/guidance/qs181](http://www.nice.org.uk/guidance/qs181)

NORFOLK COUNTY COUNCIL PUBLIC HEALTH (2018) *Consultation response for Application no 18/00330/F* <https://planning.norwich.gov.uk/online-applications/applicationDetails.do?keyVal=P4YNSALX0J300&activeTab=summary>

NORWICH CITY COUNCIL PLANNING OFFICER REPORT (2018) *Application no 18/00330/F*. December 2018 <https://planning.norwich.gov.uk/online-applications/applicationDetails.do?keyVal=P4YNSALX0J300&activeTab=summary>

OGEN, Y. (2020) Assessing nitrogen dioxide (NO<sub>2</sub>) levels as a contributing factor to the coronavirus (COVID-19) fatality rate. *Science of The Total Environment*, p.138605.

PHE (PUBLIC HEALTH ENGLAND) (2014) *Estimating Local Mortality Burdens Associate with Particulate Air Pollution* London: Public Health England.

PHE (2018) *Associations of long-term average concentrations of nitrogen dioxide with mortality* A report by the Committee on the Medical Effects of Air Pollutants Chair: F Kelly. London: Public Health England.

PHE (2019a) *Improving outdoor air quality and health: review of interventions* London; Public Health England

PHE (2019b) *Estimation of costs to the NHS and social care due to the health impacts of air pollution* London: Public Health England.

R(CLIENTEARTH (NO 3)) V (1) SECRETARY OF STATE FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS (2) THE SECRETARY OF STATE FOR TRANSPORT AND (3) WELSH MINISTERS [2018] EWHC 315 (ADMIN)

R(SHIRLEY) V SSHCLG, CANTERBURY CC AND CORINTHIAN MOUNTFIELD LTD ([2019] EWCA CIV 22)

SAMUELS A (2015) Infrastructure Act 2015, *Journal of Planning and Environment Law*, 646–52.

SUFFOLK COASTAL DC V HOPKINS HOMES AND RICHBOROUGH ESTATES V CHESHIRE EAST BC [2017] UKSC 37

TIMMERS, V.R. AND ACHTEN, P.A. (2016) Non-exhaust PM emissions from electric vehicles. *Atmospheric Environment*, 134:10-17.

TCPA (TOWN AND COUNTRY PLANNING ASSOCIATION) (2015) *Public Health in Planning Good Practice Guide*

TCPA (2019) *The State of the Union: Reuniting Health with Planning in Promoting Healthy Communities*

TRAVAGLIO, M., YU, Y., POPOVIC, R., LEAL, N.S. AND MARTINS, L.M. (2020). *Links between air pollution and COVID-19 in England*.

<https://www.medrxiv.org/content/medrxiv/early/2020/04/28/2020.04.16.20067405.full.pdf> Accessed 15 June 2020.

WILLIAMS M, EVANGELOPOULOS D, KATSOUYANNI K AND WALTON H (2019) *Personalising the Health Impacts of Air Pollution* London: Kings College London.

WORLD HEALTH ORGANIZATION (2013) *Review of evidence on health aspects of air pollution—REVIHAAP Project*. World Health Organization, Copenhagen, Denmark