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Air Quality Assessment: Connell Co-op College, Manchester

February 2021

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Document Control

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Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
J4387A/1/F2	19 February 2021	Final	Stephen Moorcroft (Director)

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Executive Summary

The air quality impacts associated with the proposed expansion of the existing Connell Co-op College in Manchester have been assessed. The development will provide a new school block containing 10 classrooms, together with associated car parking.

The proposed development is located approximately 80 m from Alan Turing Way (A6010) and approximately 100 m from Wilson Street, in a location where pollutant concentrations will be close to background levels; future users of the proposed development will thus experience good air quality.

The proposed development will only generate a small volume of additional traffic on the local road network, and the assessment has shown that there will be no significant impact on local air quality.

Overall, the operational air quality effects of the proposed development are judged to be 'not significant'.

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1 Introduction

1.1 This report describes the potential air quality impacts associated with the proposed expansion of the existing Connell Co-op College in Manchester. The proposed development will involve the provision of a new school block containing 10 classrooms, and an associated car park to provide 12 new parking spaces (including one space for disabled use only).

1.2 The proposed development lies in close proximity to the Greater Manchester Air Quality Management Area (AQMA) declared by Manchester City Council (MCC) for exceedances of the annual mean nitrogen dioxide (NO_2) objective. The proposed development will introduce new exposure into this area of potentially poor air quality; an assessment is thus required to determine the air quality conditions that future users will experience. It will also generate additional traffic on local roads, which may impact on air quality at existing residential properties along the affected road network. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide and fine particulate matter (PM_{10} and $PM_{2.5}$).

1.3 The location and setting of the proposed development are shown in Figure 1, along with the relevant nearby AQMA and monitoring sites.

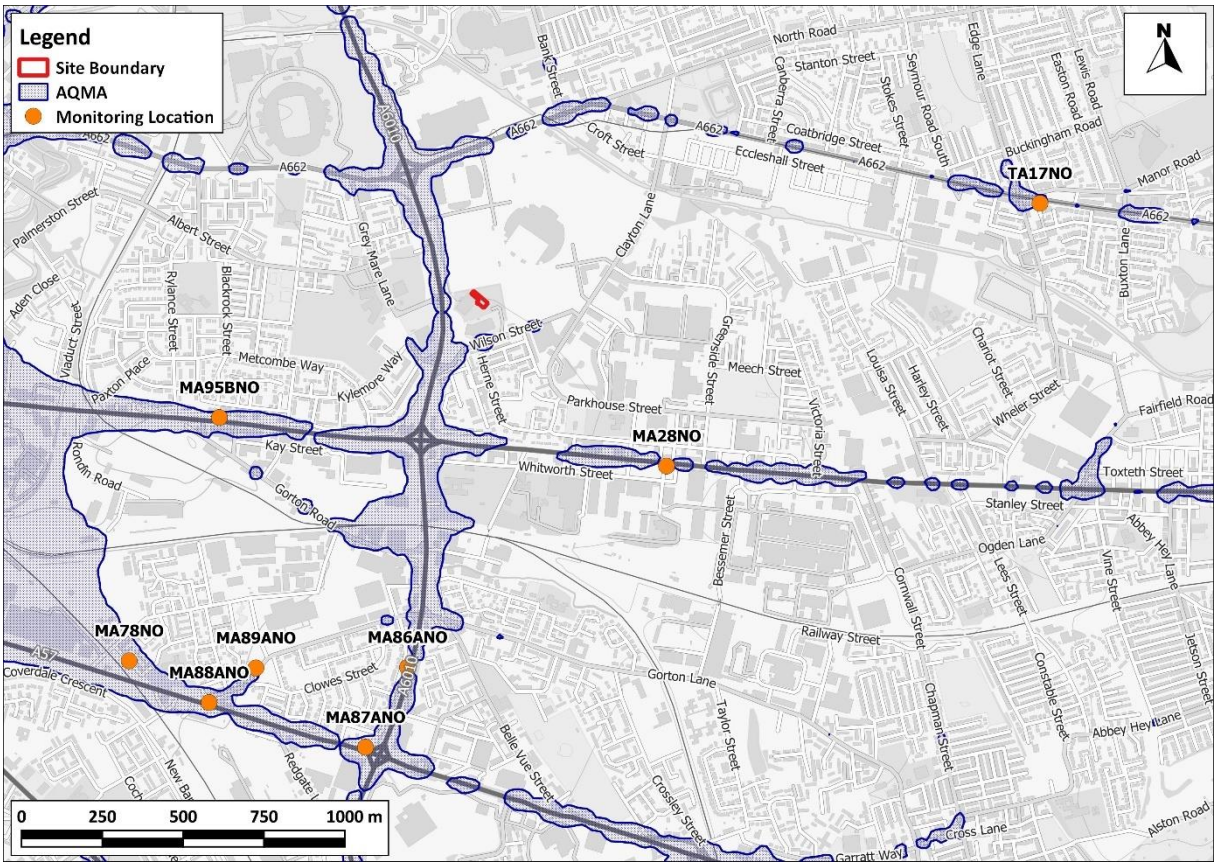

Figure 1: Proposed Development Setting in the Context of Air Quality

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1.4 This report describes existing local air quality conditions (base year 2019) and considers the potential air quality impacts of the proposed development and the air quality conditions that future users are likely to experience in the anticipated year of opening (2021). It has been prepared taking into account all relevant local and national guidance and regulations.

2 Policy Context

2.1 The United Kingdom formally left the European Union (EU) on 31 January 2020; until the end of 2020 there will be a transition period while the UK and EU negotiate additional arrangements. During this period EU rules and regulations will continue to apply to the UK. All European legislation referred to in this report is written into UK law and will remain in place beyond 2020, unless amended, although there is uncertainty at this point in time as to who will enforce the requirements of some of this legislation.

Air Quality Strategy

2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Clean Air Strategy 2019

2.3 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

2.4 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have

zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.5 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has since announced *"plans to bring forward an end to the sale of new petrol and diesel cars and vans to 2035, or earlier if a faster transition is feasible, subject to consultation, as well as including hybrids for the first time"*. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

Planning Policy

National Policies

2.6 The National Planning Policy Framework (NPPF) (2019a) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:

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

2.7 To prevent unacceptable risks from air pollution, Paragraph 170 of the NPPF states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by…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".

2.8 Paragraph 180 states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".

2.9 More specifically, on air quality, Paragraph 180 makes clear that:

"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".

2.10 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019b), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified".

2.11 Regarding plan-making, the PPG states:

"It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality".

2.12 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan "*identifies measures that will be introduced in pursuit of the objectives and can have implications for planning*".

2.13 Regarding the need for an air quality assessment, the PPG states that:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity".

2.14 The PPG sets out the information that may be required in an air quality assessment, making clear that:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".

2.15 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented".

Local Transport Plan

2.16 The Greater Manchester Combined Authority's (GMCA) Greater Manchester Transport Strategy 2040 (Greater Manchester Combined Authority, 2017) was published in February 2017 and mainly focuses on the critical long-term challenges being faced in Greater Manchester, such as a rapidly growing and ageing population, climate change and the need to improve productivity and reduce poverty and social inequality within the City Region. The Strategy includes one policy relevant to air quality. Policy 8 states:

"We will work with partners to reduce, as far as possible, the emissions from transport, particularly CO_2, NO_2, particulates and noise".

Local Policies

2.17 MCC's Core Strategy (Manchester City Council , 2012) was adopted in July 2012, and within this there is one policy which refers to air quality. Policy EN16 states that:

"The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimize and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, included from Combined Heat and Power and biomass plant.

When assessing the appropriateness of locations for new development the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas."

Air Quality Action Plans

National Air Quality Plan

2.18 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018a) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA

in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a CAZ. There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the EU limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

2.19 MCC has declared an AQMA for nitrogen dioxide that covers the City Centre, the area around Manchester Airport, and the main arterial traffic routes in the city. The GMCA has developed an Air Quality Action Plan (Greater Manchester Combined Authority, 2016) which sets out a number of actions to improve air quality based on three key performance indicators: reduce traffic, increase efficiency and improve fleet. Areas for actions include:

- development control and planning regulation;
- freight and heavy goods vehicles, through urban distribution centres, freight consolidation and the use of the Delivery and Servicing Plan Toolkit;
- buses, through improvements to buses, funding and low emission vehicles;
- cycling, including promotion of cycling improvements to cycle ways and hire schemes; and
- cars, such as improvements to the electric vehicle charging network, car-use allowance and parking charges.

3 Assessment Criteria

3.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

3.2 The UK-wide objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2018b). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour mean PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m^3 (Defra, 2018b).

3.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2018b). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

3.4 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

3.5 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
Fine Particles (PM_{10})	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3 [a]
Fine Particles ($PM_{2.5}$) [b]	Annual Mean	25 µg/m^3

[a] A proxy value of 32 µg/m^3 as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM_{10} objective are possible (Defra, 2018b).

[b] The $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Screening Criteria for Road Traffic Assessments

3.6 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)[1] recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A1, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.

3.7 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A1) inside an AQMA are a change in flows of more than 25 heavy duty vehicles or 100 light duty vehicles per day; outside of an AQMA the thresholds are 100 heavy duty vehicles or 500 light duty vehicles. Where these criteria are exceeded, a detailed assessment is likely to be required, although the guidance advises that *"the criteria provided are precautionary and should be treated as indicative"*, and *"it may be appropriate to amend them on the basis of professional judgement"*.

3.8 While these screening criteria are specifically intended to act as a trigger for a detailed assessment, they can also sometimes be used to identify the extent of the road network that requires assessment. Where the change in traffic on a given road link is less than the relevant screening threshold, it is unlikely that a significant impact would occur, and these links can be disregarded unless there are additional development-related emissions affecting receptors along the link.

[1] The IAQM is the professional body for air quality practitioners in the UK.

4 Assessment Approach

Study Area

4.1 The study area for the assessment has been identified using professional judgement, focussing on the areas where impacts are anticipated to be greatest. It includes the proposed development itself, and all of the roads along which a potential significant change in traffic flows may occur. Specifically, the assessment has focussed on Wilson Street. The study area is shown in Figure 2.

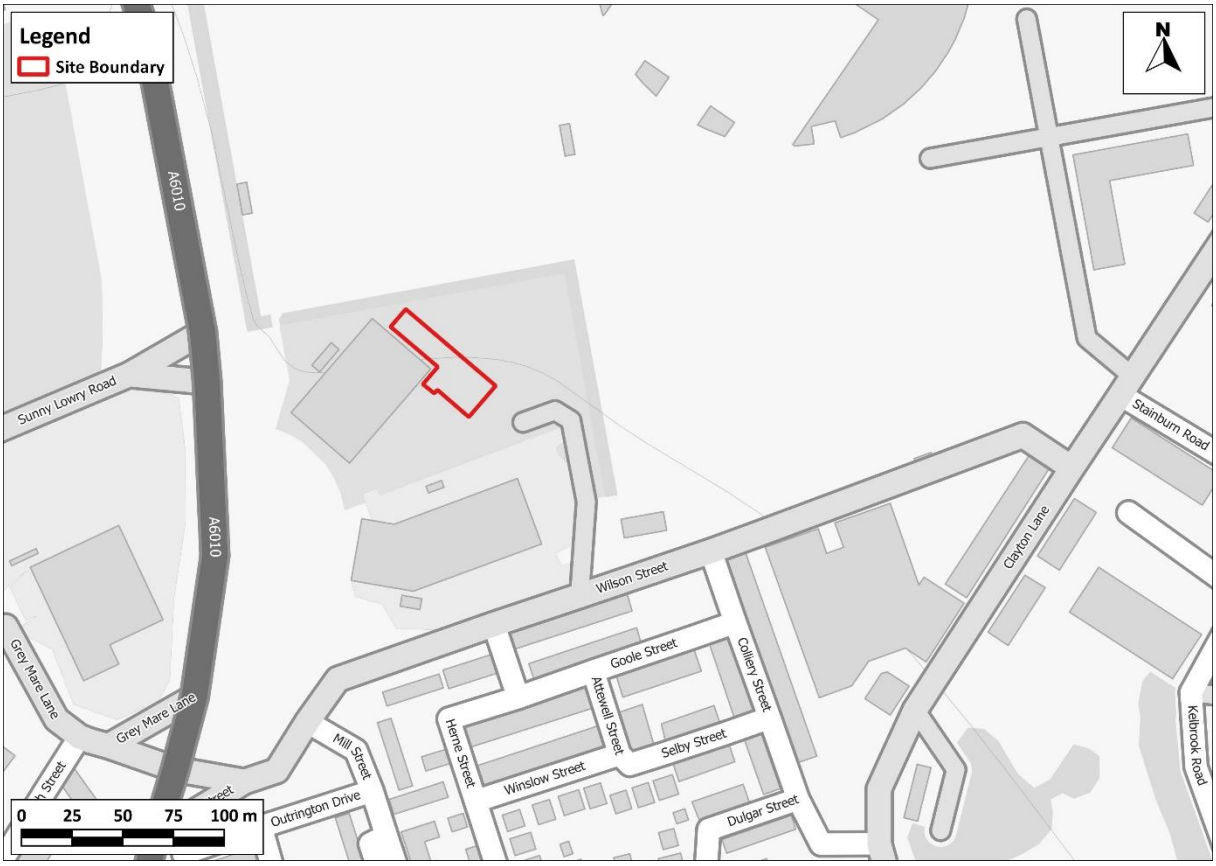

Figure 2: Study Area and the Application Site Boundary

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Existing Conditions

4.2 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:

- industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2020a);

- local sources have been identified through examination of the Council's Air Quality Review and Assessment reports;
- information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority;
- background concentrations have been defined using Defra's 2018-based background maps (Defra, 2020b). These cover the whole of the UK on a 1x1 km grid. Nitrogen dioxide background maps for 2019 have been calibrated against local measurements made at the MA78NO and MA79NO urban background diffusion tube monitoring sites. The measured nitrogen dioxide concentrations at these sites in 2019 were 33.0 µg/m^3 and 29.3 µg/m^3, respectively, while the mapped backgrounds for the grid squares within which they lie were 19.0 µg/m^3 and 19.4 µg/m^3, respectively. All mapped background nitrogen dioxide concentrations have therefore been calibrated by applying a factor of 1.62, the average factor calculated using the two sites. Mapped background concentrations of PM_{10} and $PM_{2.5}$ have not been adjusted; and
- whether or not there are any exceedances of the annual mean EU limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2020c) (2020d). These maps are used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to EU data quality standards, to report exceedances of the limit value to the EU. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2020d), which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

Road Traffic Impacts

4.3 The first step in considering the road traffic impacts of the proposed development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 3.6 and detailed further in Appendix A1. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Assessment of Operational Significance

4.4 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement; the experience of the consultants preparing the report is set out in Appendix A2. Full details of the EPUK/IAQM approach are provided in Appendix A1.

5 Baseline Conditions

Relevant Features

5.1 The proposed development is located within the grounds of the Connell Co-op College, in Manchester, and is bounded by one of the College's main buildings to the southwest. To the south lies the College's existing car park, while sports fields lie outside the College grounds to the north and east. There are residential properties to the south of the College, across Wilson Street.

5.2 The proposed development is located near to an AQMA as highlighted in Figure 1.

Industrial sources

5.3 No significant industrial or waste management sources have been identified that are likely to affect the proposed development, in terms of air quality.

Local Air Quality Monitoring

5.4 MCC operates 17 automatic monitoring stations within its area, however, the closest monitor (MAN3) is located approximately 3.1 km to the west of the proposed development and is not considered to be representative of conditions at the site. The Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Staffordshire Scientific Services (using the 20% TEA in water method), with eight sites located within 1.7 km of the proposed development. Annual mean concentrations for the years 2014 to 2019 are summarised in Table 2. Exceedances of the objectives are shown in bold. The monitoring locations are shown in Figure 3. The monitoring data have been taken from the Council's website (Manchester City Council , 2020).

Table 2: Summary of Annual Mean NO_2 Monitoring (2014-2019) (µg/m^3) [a]

Site ID.	Site Type	Location	2014	2015	2016	2017	2018	2019
TA17NO	Roadside	Ashton New Road (A662)	-	34.8	36.2	36.4	31.1	34.1
MA28NO	Roadside	Ashton Old Road (A635)	35.7	34.6	**41.0**	38.5	37.1	36.1
MA78NO	Urban Background	Roston Avenue	31.0	31.9	37.0	38.3	33.2	33.0
MA86ANO	Roadside	Pottery Lane (A6010)	-	35.0	37.3	34.5	31.8	-
MA87ANO	Roadside	Hyde Road (A57)	-	35.2	37.1	37.2	33.2	34.0
MA88ANO	Roadside	Hyde Road (A57)	-	**41.2**	**52.7**	**47.5**	**44.3**	**43.3**
MA89ANO	Roadside	Wenlock Way	-	30.4	35.7	34.4	30.3	30.3
MA95BNO	Roadside	Ashton Old Road (A635)	-	-	-	-	-	**43.4**
Objective			**40**					

[a] Exceedances of the objectives are shown in bold.

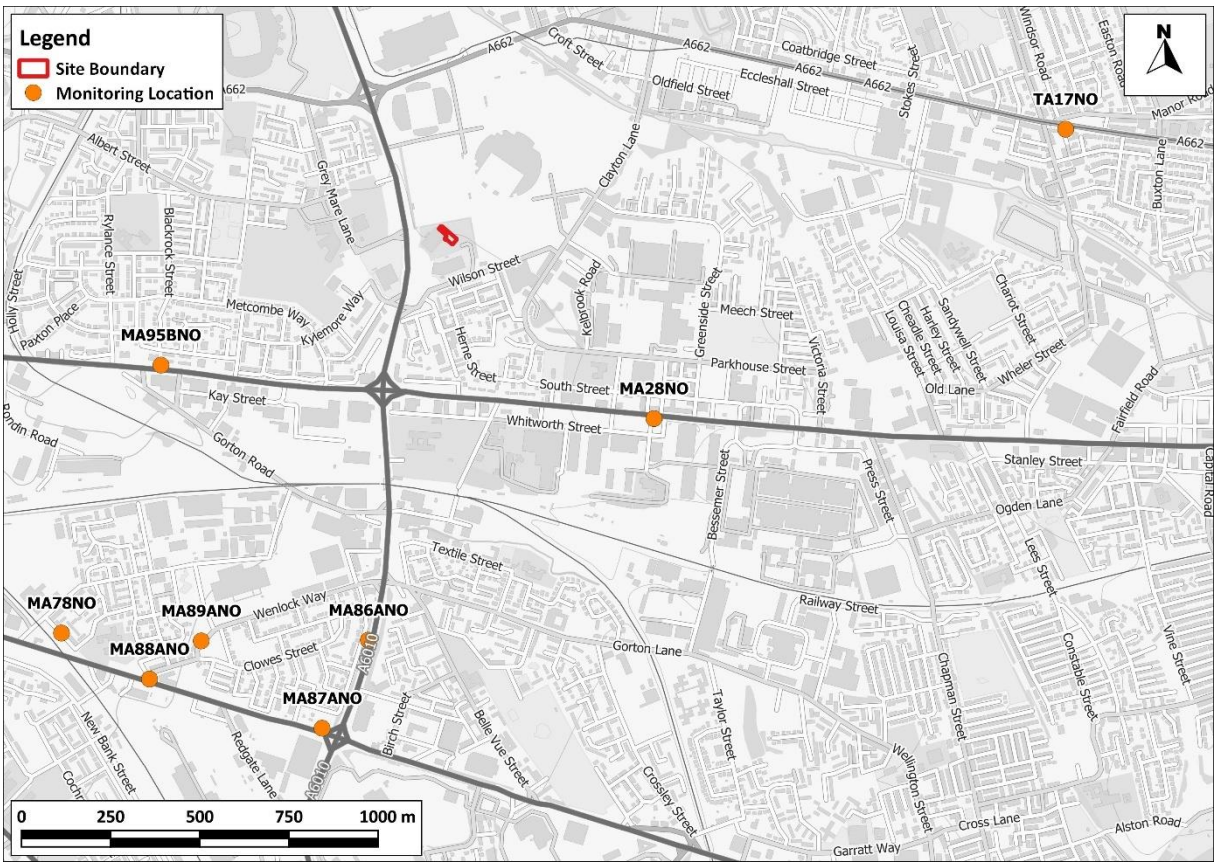

Figure 3: Monitoring Locations and the Application Site Boundary

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5.5 As shown in Table 2, exceedances of the annual mean nitrogen dioxide objective have been measured at site MA28NO in 2016, site MA95BNO in 2019 and at site MA88NO in every year from 2015 to 2019. However, these are roadside sites and unlikely to be representative of conditions at the application site. Diffusion tube monitoring sites MA78NO and MA89ANO are deemed to be more representative of conditions at the application site, and levels have remained well below the objective.

5.6 There is no clear trend in monitoring results over the past six years.

5.7 The MAN3 urban centre automatic monitoring station, located approximately 3.1 km west of the proposed development, is the closest station which measures PM_{10} and $PM_{2.5}$ concentrations. Annual mean results for the years 2014 to 2019 are summarised in Table 3, while results relating to the daily mean objective are summarised in Table 4. The monitoring data for 2014 have been taken from the GMCA's 2019 Annual Status Report (ASR) (Greater Manchester Combined Authority,

2019) and the monitoring data for 2015 onwards have been taken from the GMCA's 2020 ASR (Greater Manchester Combined Authority , 2020).

Table 3: Summary of Annual Mean PM_{10} and $PM_{2.5}$ Monitoring (2014-2019) (µg/m^3)

Site ID.	Site Type	Location	2014	2015	2016	2017	2018	2019
PM_{10}								
MAN3	Urban Centre	Manchester Piccadilly	20	20	20	20	21	20
Objective			**40**					
$PM_{2.5}$								
MAN3	Urban Centre	Manchester Piccadilly	12	10	10	8	11	12
Objective			**25 [a]**					

[a] The $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Table 4: Number of Days With PM_{10} Concentrations Above 50 µg/m^3

Site No.	Site Type	Location	2014	2015	2016	2017	2018	2019
MAN 3	Urban Centre	Manchester Piccadilly	5	3	3	3	2	7
Objective			**35**					

5.8 No exceedances of the PM_{10} or $PM_{2.5}$ objectives have been measured and there is no clear trend in monitoring results over the past six years.

Exceedances of EU Limit Value

5.9 There are no AURN (Defra, 2020e) monitoring sites within the study area with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2020d), which are used to report exceedances of the limit value to the EU, do not identify any exceedances within the study area in 2019. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational.

5.10 As discussed in Paragraph 2.18, Defra has produced an Air Quality Plan (Defra, 2017) to tackle roadside nitrogen dioxide concentrations in the UK. Within this Plan, MCC is listed as an authority upon which the Government has placed legal duties to *"develop and implement a plan designed to deliver compliance in the shortest time possible"*. MCC is on this list due to exceedances of the EU limit value being identified beyond 2020 alongside Mancunian Way, which is located approximately 2.9 km from the proposed development, thus future limit value exceedances are unlikely to be

affected by the proposed development. The GMCA, of which MCC is a constituent, has produced a local action plan.

5.11 The measures to be taken by Greater Manchester are:

- a Clean Air Zone (CAZ);
- a multi-million pound funding package; and
- the trebling of the number of public electric vehicle charging points.

5.12 The proposed CAZ is to be introduced across the whole of Greater Manchester in two phases, to include buses, coaches, taxis, private hire vehicles (PHVs) and Heavy Goods Vehicles (HGV)s in 2021, extending to vans, minibuses, motorhomes and motorised horseboxes in 2023 (Greater Manchester, 2019).

Background Concentrations

5.13 Estimated background concentrations in the study area are set out in Table 5 and are all below the objectives.

Table 5: Estimated Annual Mean Background Pollutant Concentrations in 2019 and 2021 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2019	33.2	12.6	8.5
2021	30.4	12.2	8.2
Objectives	**40**	**40**	**25 [a]**

[a] The $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

6 Impact Assessment

Impacts at Existing Receptors

6.1 The proposed development is expected to generate a total of 252 vehicular movements per day, during term-time; this equates to approximately 135 AADT movements. Out of these, it is expected that 107 vehicles will head southwest from the entrance on Wilson Street, and the remaining 28 will head northeast.

6.2 The number of vehicles that will head northeast is below the 100 / 500 AADT movements screening threshold for use inside / outside of an AQMA in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017). There will thus be no significant impacts on air quality at properties to the east of the site.

6.3 There is a small area of the AQMA on Wilson Street, covering approximately six residential properties. The development-generated traffic heading southwest on Wilson Street through this section of AQMA, slightly exceeds the screening threshold of 100 AADT movements. Wilson Street is a minor road and the residential properties are located more than 100 m away from the nearest main road (Alan Turing Way (A6010)); nitrogen dioxide concentrations are expected to be represented by those measured at the MA78NO and MA89ANO diffusion tube monitoring sites, and well below the objective (see Table 2). In addition, according to the EPUK/IAQM guidance, if an affected road has concentrations below 90% of the objective (36 µg/m^3), the less stringent threshold (500 AADT) is likely to be more appropriate. When the vehicles reach Alan Turing way, they will disperse to the north and south, such that there will be no further road links on which development-generated traffic exceeds the screening criterion.

6.4 It is judged that the proposed development will not have a significant impact on local air quality and there is no requirement for a detailed assessment.

Impacts of Existing Sources on Future Users of the Development

6.5 The proposed development is located well away from any busy roads, approximately 80 m from Alan Turing Way (A6010) and approximately 100 m from Wilson Street, in an area where pollutant concentrations would be expected to be close to background levels. Background concentrations at the site are well below the objectives (see Table 5), thus it is expected that future users will experience acceptable air quality, and there is no need for a detailed assessment.

Significance of Operational Air Quality Effects

6.6 The operational air quality effects without mitigation are judged to be ‘not significant’. This professional judgement is made in accordance with the methodology set out in Appendix A1, and takes account of the assessment that:

- pollutant concentrations within the proposed development will be well below the objectives, thus future users will experience good air quality; and
- the proposed development will not have a significant impact on local air quality.

7 Mitigation

Good Design and Best Practice

7.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The proposed development incorporates the following good design and best practice measures, which have been accounted for in the assessment as far as is possible:

- provision of three electric vehicle charging points, with passive provision for the remaining nine car parking spaces;
- setting back of the development buildings from roads by approximately 80 m from Alan Turing Way (A6010) and approximately 100 m from Wilson Street; and
- provision of a detailed travel plan setting out measures to encourage sustainable means of transport (public, cycling and walking) via provision of adequate covered and secured cycle spaces, designing the development in accordance with a 'pedestrian first' policy with good lighting, and improved infrastructure and layouts to improve accessibility and safety.

Recommended Mitigation

7.2 The assessment has demonstrated that the proposed development will not cause any exceedances of the air quality objectives and that the overall effect of the proposed development will be 'not significant'. It is, therefore, not considered appropriate to propose further mitigation measures for this development.

7.3 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law). The local air quality plan that MCC has produced in order to address limit value exceedances in its area will also help to improve air quality.

8 Conclusions

8.1 The assessment has considered the impacts of the proposed development on local air quality in terms of emissions from road traffic generated by the completed and occupied development.

Operational Impacts

Impacts

8.2 Air quality conditions for future users of the proposed development have been shown to be acceptable, with concentrations well below the air quality objectives across the site.

8.3 The additional traffic generated by the proposed development falls below recognised screening thresholds and there will be no impacts upon local air quality.

Significance

8.4 The overall operational air quality effects of the proposed development are judged to be 'not significant'.

Policy Implications

8.5 The proposed development is consistent with Paragraph 180 of the NPPF, being appropriate for its location both in terms of its effects on the local air quality environment and the air quality conditions for future residents. It is also consistent with Paragraph 181, as it will not affect compliance with relevant limit values or national objectives.

9 References

Defra (2007) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*, Defra.

Defra (2017) *Air quality plan for nitrogen dioxide (NO2) in the UK*, Available: https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017.

Defra (2018a) *Supplement to the UK plan for tackling roadside nitrogen dioxide concentrations*, Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746100/air-quality-no2-plan-supplement.pdf.

Defra (2018b) *Review & Assessment: Technical Guidance LAQM.TG16 February 2018 Version*, Defra, Available: https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf.

Defra (2019) *Clean Air Strategy 2019*, Available: https://www.gov.uk/government/publications/clean-air-strategy-2019.

Defra (2020a) *UK Pollutant Release and Transfer Register*, Available: http://prtr.defra.gov.uk/map-search.

Defra (2020b) *Local Air Quality Management (LAQM) Support Website*, Available: http://laqm.defra.gov.uk/.

Defra (2020c) *2020 NO2 projections data (2018 reference year)*, Available: https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data.

Defra (2020d) *UK Ambient Air Quality Interactive Map*, Available: https://uk-air.defra.gov.uk/data/gis-mapping.

Defra (2020e) *Defra AURN Archive*, Available: https://uk-air.defra.gov.uk/interactive-map?network=aurn.

DfT (2018) *The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy*.

Greater Manchester (2019) *A summary of our proposals to improve air quality for Greater Manchester*.

Greater Manchester Combined Authority (2016) *Greater Manchester Air Quality Action Plan 2016-2021*.

Greater Manchester Combined Authority (2017) *Greater Manchester Transport Strategy 2040*.

Greater Manchester Combined Authority (2019) *2018 Air Quality Annual Status Report (ASR)*.

Greater Manchester Combined Authority (2020) *2019 Air Quality Annual Status Report* .

Manchester City Council (2012) *Core Strategy Development Plan Document*.

Manchester City Council (2020) *Monitoring reports*, [Online], Available: https://cleanairgm.com/data-hub/monitoring-reports/.

Ministry of Housing, Communities & Local Government (2019a) *National Planning Policy Framework*, Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf.

Ministry of Housing, Communities & Local Government (2019b) *Planning Practice Guidance*, Available: https://www.gov.uk/government/collections/planning-practice-guidance.

Moorcroft and Barrowcliffe et al (2017) *Land-Use Planning & Development Control: Planning For Air Quality v1.2*, IAQM, London, Available: http://iaqm.co.uk/guidance/.

The Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (2002), HMSO, Available: https://www.legislation.gov.uk/uksi/2002/3043/contents/made.

The Air Quality (England) Regulations 2000 Statutory Instrument 928 (2000), HMSO, Available: http://www.legislation.gov.uk/uksi/2000/928/contents/made.

The Air Quality Standards Regulations 2010 Statutory Instrument 1001 (2010), HMSO, Available: http://www.legislation.gov.uk/uksi/2010/1001/pdfs/uksi_20101001_en.pdf.

The European Parliament and the Council of the European Union (2008) *Directive 2008/50/EC of the European Parliament and of the Council*, Available: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0050.

10 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
EU	European Union
EV	Electric Vehicle
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
LAQM	Local Air Quality Management
$\mu g/m^3$	Microgrammes per cubic metre
NO_2	Nitrogen dioxide
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance

Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide

11 Appendices

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A1 EPUK & IAQM Planning for Air Quality Guidance

A1.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations".*

Recommended Best Practice

A1.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".

A1.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m^2 of commercial floorspace;
- are carried out on land of 1 ha or more.

A1.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
    - Spark ignition engine: 250 mgNOx/Nm^3;
    - Compression ignition engine: 400 mgNOx/Nm^3;
    - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A1.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

A1.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

Impacts of the Development on the Local Area

A1.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

A1.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A1.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A1.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A1.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

A1.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

A1.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".

A1.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

A1.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

A1.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- 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.

A1.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A1.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A2.

A2 Professional Experience

Stephen Moorcroft, BSc (Hons) MSc DIC CEnv MIEnvSc MIAQM

Mr Moorcroft is a Director of Air Quality Consultants and has worked for the company since 2004. He has over 35 years' postgraduate experience in environmental sciences. Prior to joining Air Quality Consultants, he was the Managing Director of Casella Stanger, with responsibility for a business employing over 100 staff and a turnover of £12 million. He also acted as the Business Director for Air Quality services, with direct responsibility for a number of major Government projects. He has considerable project management experience associated with Environmental Assessments in relation to a variety of development projects, including power stations, incinerators, road developments and airports, with particular experience related to air quality assessment, monitoring and analysis. He has contributed to the development of air quality management in the UK, and has been closely involved with the LAQM process since its inception. He has given expert evidence to numerous public inquiries, and is frequently invited to present to conferences and seminars. He is a Member of the Institute of Air Quality Management.

Dr Imogen Heard, BSc (Hons) MSc PhD MInstPhys

Dr Heard is a Senior Consultant with AQC with over ten years' experience in the field of air quality. She has been involved in numerous development projects including road schemes, energy from waste facilities, urban extensions and energy centres. These have included the use of ADMS-5 and ADMS-Roads dispersion models to study the impacts of a variety of pollutants, including nitrogen dioxide, PM_{10} and $PM_{2.5}$, and the preparation of air quality assessment reports and air quality chapters for Environmental Statements. She also has experience in undertaking construction dust risk assessments and Air Quality Neutral assessments, as well as in preparing local authority reports. Prior to joining AQC she worked as a scientist in the Atmospheric Dispersion and Air Quality area at the UK Met Office for four years, modelling the dispersion of a range of pollutants over varying spatial and temporal scales.

George Chousos, BSc MSc AMIEnvSc AMIAQM

Mr Chousos is an Assistant Consultant with AQC, having joined in May 2019. Prior to joining AQC, he completed an MSc in Air Pollution Management and Control at the University of Birmingham, specialising in air pollution control technologies and management, and data processing using R. He also holds a degree in Environmental Geoscience from the University of Cardiff, where he undertook a year in industry working in the field of photo-catalytic technology. He is now gaining experience in the field of air quality monitoring and assessment.