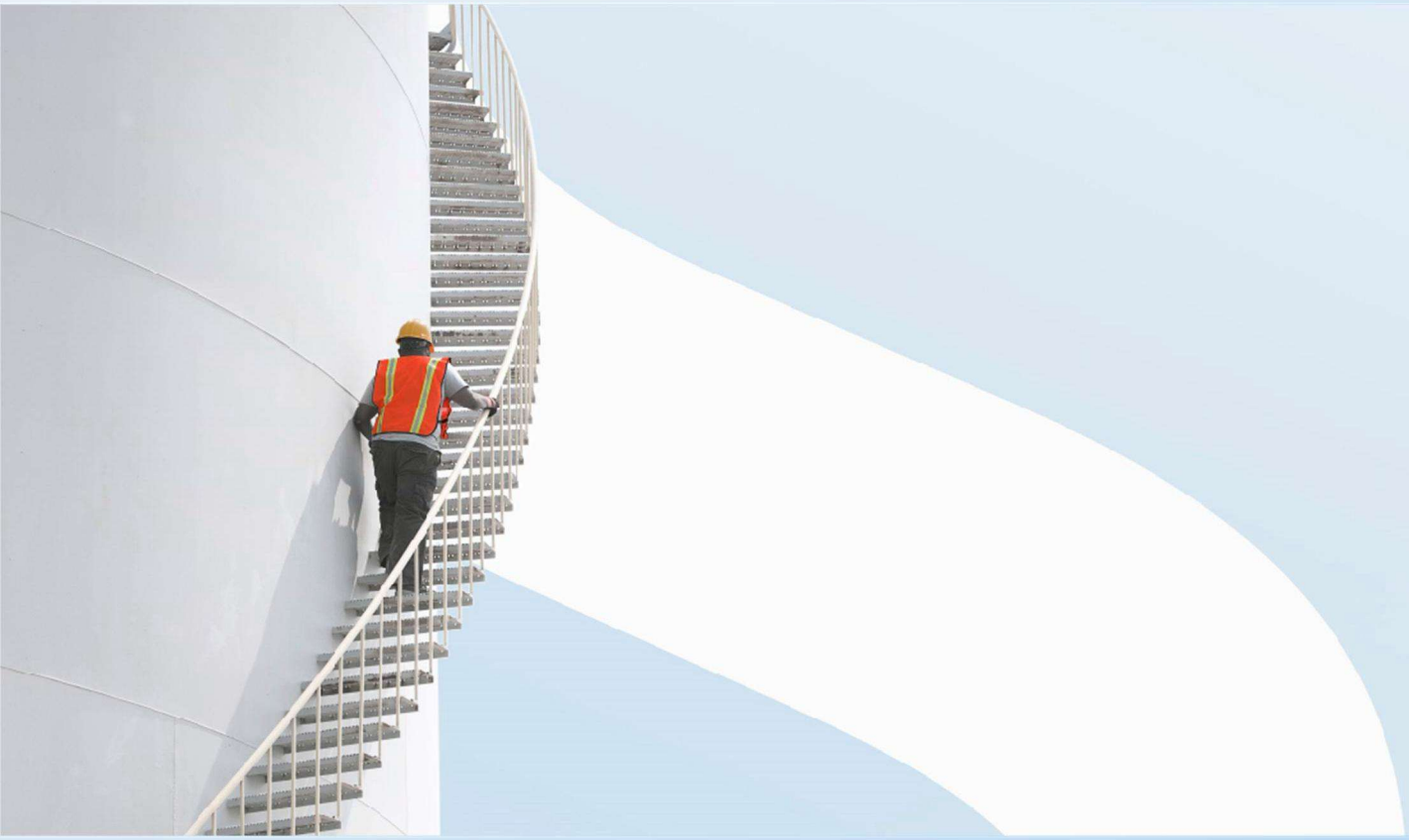
North Barton Road Land Owners Group

SOUTH WEST CAMBRIDGE: LAND NORTH OF BARTON ROAD

Air Quality Constraints Report



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EXECUTIVE SUMMARY

The Site lies within the administrative boundaries of both Cambridge City Council and South Cambridgeshire District Council.

The Site comprises an area of approximately 156 hectares and is located on the western outskirts of Cambridge. It is bounded along the western edge by the M11 and to the south by the A603 Barton Road.

The Site is located within the green belt and therefore currently comprises green fields / agricultural land. The development proposals for the Site are in their early stages but are likely to be for a large mixed development including up to 3,000 residential dwellings, community facilities, neighbourhood centre, new green infrastructure centre and sustainability measures.

This report presents the findings of a review of the baseline air quality conditions, existing air pollution sources and sensitive receptors in the vicinity of the Site and identifies the potential air quality constraints to the development of the Site, during both the construction and operational phases. The report also considers the suitability of the Site for the proposed end uses and, where appropriate, makes recommendations for mitigation measures that may be incorporated into the emerging masterplan.

1. INTRODUCTION

1.1.1. WSP has been commissioned by the North Barton Road Landowners Group (NBRLOG) to undertake a desk based review of potential air quality constraints and opportunities associated with the proposed development of Land North of Barton Road, Cambridge, hereafter referred to as the 'Proposed Development' or 'Site'.

1.1.2. The Site lies within the administrative boundaries of Cambridge City Council (CCC) and South Cambridge District Council (SCDC), and is situated on the western edge of Cambridge, within the existing Green Belt. It comprises an area of 156ha and is bordered to the west by the M11 motorway, to the south by the A603 Barton Road, to the north and east by existing educational facilities/buildings (including the West Cambridge site of the University of Cambridge) and existing residential settlement. The location of the Site is shown on Figure 1.

1.1.3. The vision for the Proposed Development is a landscape-led urban extension to Cambridge. Whilst the development proposals are in their infancy, it is anticipated that they will include the following uses:

- Approximately 2,500 to 3,000 dwellings (including affordable/social housing, staff and student accommodation, and housing for the elderly);
- Community facilities, including a primary school, community centre, health centre;
- Neighbourhood centre, including supermarket, shops, services and facilities;
- Connections to walking, cycling and public transport networks;
- New green infrastructure network (e.g. open spaces, sports pitches, county park, wildlife area); and
- Sustainability measures, such as water recycling system, district heating system.

1.1.4. This report presents the findings of a review of existing air quality conditions in the vicinity of the Site and identifies any potential air quality constraints and opportunities associated with the development of the Site, during both the construction and operational phases. The report also considers the suitability of the Site for the proposed end uses and, where appropriate, makes recommendations for mitigation measures that may be incorporated into the emerging masterplan.

2. LEGISLATION AND POLICY

2.1. AIR QUALITY LEGISLATION & POLICY

2.1.1. A summary of the relevant air quality legislation and policy is provided below.

UK AIR QUALITY STRATEGY

2.1.2. The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)[1]. The AQS provides a framework for reducing air pollution in the UK with the aim of meeting the requirements of European Union legislation.

2.1.3. The AQS also sets standards and objectives for nine key air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3 butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3), and polycyclic aromatic hydrocarbons (PAHs).

2.1.4. The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) with regards to current scientific knowledge about the effects of each pollutant on health and the environment.

2.1.5. The air quality objectives are policy based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

2.1.6. The AQS contains a framework for considering the effects of a finer group of particles known as '$PM_{2.5}$' as there is increasing evidence that this size of particles can be more closely associated with observed adverse health effects than PM_{10}. Local Authorities are required to work towards reducing emissions/concentrations of particulate matter within their administrative area. However, there is no statutory objective given in the AQS for $PM_{2.5}$ at this time.

2.1.7. A summary of the standards and objectives is provided in Appendix A.

AIR QUALITY REGULATIONS

2.1.8. Many of the objectives in the AQS have been made statutory in England with the Air Quality (England) Regulations 2000[2] and the Air Quality (England) (Amendment) Regulations 2002[3] for the purpose of Local Air Quality Management (LAQM).

2.1.9. These Regulations require that likely exceedances of the AQS objectives are assessed in relation to:

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[1] Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2)

[2] The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928

[3] The Air Quality (England) (Amendment) Regulations 2002- Statutory Instrument 2002 No.3043

"…the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present…"

2.1.10. The Air Quality Standards Regulations 2010[4] transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England, which sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as PM_{10}, $PM_{2.5}$ and NO_2. The limit values for NO_2 and PM_{10} are the same concentration levels as the relevant. AQS objectives and the limit value for $PM_{2.5}$ is a concentration of 25µg/m^3.

ENVIRONMENTAL PROTECTION ACT 1990 - CONTROL OF DUST AND PARTICULATES ASSOCIATED WITH CONSTRUCTION

2.1.11. Section 79 of the Environmental Protection Act 1990 gives the following definitions of statutory nuisance relevant to dust and particles:

"Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health or a nuisance"; and

"Any accumulation or deposit which is prejudicial to health or a nuisance"

2.1.12. Following this, Section 80 says that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

2.1.13. There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist. Nuisance is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

ENVIRONMENT ACT 1995

2.1.14. Under Part IV of the Environment Act 1995, local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the air quality objectives defined in the Regulations. Where the objectives are not likely to be achieved, an authority is required to designate an Air Quality Management Area (AQMA). For each AQMA the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it intends to work towards achieving air quality standards in the future.

CLEAN AIR STRATEGY

2.1.15. The Clean Air Strategy[5] outlines the Government's plan to tackle all sources of air pollution. The strategy sets out the comprehensive action that is required from across all parts of Government and society. New legislation will create a stronger and more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air

[4] The Air Quality Standards Regulations 2010 - Statutory Instrument 2010 No. 1001

[5] Defra (2019) Clean Air Strategy 2019 [online] https://www.gov.uk/government/publications/clean-air-strategy-2019

pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an existing air pollution problem.

2.2. PLANNING POLICY

2.2.1. A summary of the national and local planning policy relevant to air quality is provided below.

NATIONAL PLANNING POLICY

National Planning Policy Framework

2.2.2. The Government's overall planning policies for England are described in the National Planning Policy Framework[6]. The core underpinning principle of the Framework is the presumption in favour of sustainable development, defined as:

- *'… meeting the needs of the present without compromising the ability of future generations to meet their own needs*

  One of the three overarching Objectives of the NPPF is that planning should *"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."*

2.2.3. In relation to air quality, the following paragraphs in the document are relevant:

- Paragraph 54, which states *"Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."*
- Paragraph 103, which states *"Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health."*
- Paragraph 170, which states *"Planning policies and decisions should contribute to and enhance the natural and local environment by: …e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."*
- Paragraph 180, which 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."*

[6] Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework.

- Paragraph 181, which states *"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."*

LOCAL PLANNING POLICY

Cambridge City Council

Cambridge Local Plan[7]

2.2.4. Policy 36 'Air Quality, Odour and Dust' within the 2018 Local Plan states:

"Development will be permitted where it can be demonstrated:

a. *that it does not lead to significant adverse health effects on health, environment or amenity from polluting or malodourous emissions, or dust or smoke emissions to air;*

b. *where development is a sensitive end-use, that there will not be any significant adverse effects on health, the environment or amenity arising from existing poor air quality, sources of odour or other emissions to air.*

According to end-use and the nature of the area and application, applicants must demonstrate that:

a. *there is no adverse effect on air quality in an air quality management area (AQMA);*

b. *pollution levels within the AQMA will not have a significant adverse effect on the proposed use/users;*

c. *the development will not lead to the declaration of a new AQMA;*

d. *the development will not interfere with the implementation of the current Air Quality Action Plan (AQAP);*

e. *any sources of emissions to air, odours, and fugitive dust generated by the development are adequately mitigated so as not to lead to loss of amenity for existing and future occupants and land uses; and*

f. *any impacts on the proposed use from existing poor air quality, odour and emissions are properly monitored and mitigated by the developer."*

2.2.5. In addition, Policy 28 relates to 'Carbon reduction, community energy networks, sustainable design and construction, and water use' and states that: "*All developments should take the available*

[7] Cambridge City Council (October 2018) Cambridge Local Plan.

opportunities to integrate the principles of sustainable design and construction into the design proposals...". It then advises about the requirement for promoters of major development to submit a sustainability statement with their planning application, outlining their approach to a range of sustainability issues including climate change adaptation, carbon reduction, and site waste management.

2.2.6. Policy 29 'Renewable and low carbon energy generation' states that development that includes the provision of renewable and/or low carbon energy will be supported but should show how any adverse impacts on the environment have been minimised, including air quality. Furthermore, where adverse effects remain, it should be demonstrated that the wider social, economic and environmental benefits outweigh these.

2.2.7. Policy 71 'Trees' relates to the need to preserve, protect and enhance trees and vegetation growth where possible within development proposals and the "*benefit of trees in the urban environment" and states:*

"For the environment, trees can reduce the urban heat island effect and sequester carbon…improve air quality, reduce dust particles…"

Air Quality in Cambridge Developers Guide

2.2.8. CCC have published their own air quality guidance for developers[8]. This guide advises on: when an air quality assessment is likely to be required; what an air quality assessment should include; and, provides guidance on determining the significance of any predicted impacts on air quality.

2.2.9. In addition, CCC has developed an interim guidance note[9] for developers to provide advice on how to minimise the impact of emissions from proposed Combined Heat and Power (CHP) installations on local air quality. The guidance note sets the following emission standards for CHP installations, which will be secured through a planning condition:

- Spark ignition engine: less than 150 $mgNO_x/Nm^3$;
- Compression ignition engine: less than 400 $mgNO_x/Nm^3$; and
- Gas Turbine: less than 50 $mgNO_x/Nm^3$

South Cambridgeshire District Council

South Cambridgeshire Local Plan[10]

2.2.10. Policy SC/12 Air Quality states:

"1. Where development proposals would be subject to unacceptable air quality standards or would have an unacceptable impact on air quality standards they will be refused.

[8] Cambridge City Council (September 2008) Air Quality in Cambridge Developers Guide

[9] Cambridge City Council: Gas Fired Combined Heat and Power (CHP) Advice Note for Developers on reducing the impact on Air Quality. Available from: https://www.cambridge.gov.uk/media/3452/gas-fired-chp-developers-guide.pdf

[10] South Cambridgeshire District Council (Adopted September 2018) South Cambridgeshire Local Plan

2. Where emissions from the proposed development are prescribed by EU limit values or national objectives, the applicant will need to assess the impact on local air quality by undertaking an appropriate air quality assessment and detailed modelling exercise having regard to guidance current at the time of the application to show the national objectives will still be achieved.

3. Development will not be permitted where it would adversely affect air quality in an Air Quality Management Area (AQMA); or lead to the declaration of a new AQMA through causing a significant deterioration in local air quality by increasing pollutant levels either directly or indirectly; or if it would expose future occupiers to unacceptable pollutant levels.

4. Larger development proposals that require a Transport Assessment and a Travel Plan as set out in Policy TI/2 will be required to produce a site based Low Emission Strategy. This will be a condition of any planning permission given for any proposed development which may result in the deterioration of local air quality and will be required to ensure the implementation of suitable mitigation measures.

5. Development will be permitted where:

- *a. It can be demonstrated that it does not lead to significant adverse effects on health, the environment or amenity from emissions to air; or*
- *b. Where a development is a sensitive end use, that there will not be any significant adverse effects on health, the environment or amenity arising from existing poor air quality.*

6. Specifically, applicants must demonstrate that:

- *c. There is no adverse effect on air quality in an Air Quality Management Area (AQMA) from the development;*
- *d. Pollution levels within the AQMA will not have a significant adverse effect on the proposed use/users;*
- *e. The development will not lead to the declaration of a new AQMA;*
- *f. The development will not interfere with the implementation of and should be consistent with the current Air Quality Action Plan;*
- *g. The development will not lead to an increase in emissions, degradation of air quality or increase in exposure to pollutants at or above the health based air quality objective;*
- *h. Any impacts on the proposed use from existing poor air quality, are appropriately mitigated;*
- *i. The development promotes sustainable transport measures and used of low emission vehicles in order to reduce the air quality impacts of vehicles.*

7. Applicants shall, where appropriate, prepare and submit with their application, a relevant assessment, taking into account guidance current at the time of the application."

2.2.11. Policy SC/14 Odour and Other Fugitive Emissions to Air states:

"1. Development likely to generate malodours and emissions to air such as dust, fumes, smoke, heat, radiation, gases, steam or other forms of pollution will only be permitted where it can be demonstrated that it will not have significant adverse effects on:

- *a. Health;*

b. *The amenity of existing or proposed sensitive end users;*

c. *The wider environment.*

2. In appropriate circumstances an odour or other emissions to air impact assessment may be required to be submitted."

Greater Cambridge Local Plan

2.2.12. CCC and SCDC are currently working together to prepare a new joint Local Plan for the Greater Cambridge area. They have commenced the first stage, which is to carry out an initial Issues and Options Consultation to determine how the two local authorities will work together to guide development and growth within Greater Cambridge.

Supplementary Planning Documents (SPDs)

2.2.13. CCC has a Sustainable Design and Construction SPD[11], which was developed to support the policies within the previous 2006 Cambridge Local Plan relating to pollution prevention and sustainability. The SPD therefore provides some technical guidance on: when an air quality assessment will be required; what an assessment should include; the methodology to be adopted; and, options for mitigating potential impacts. However, SCDC and CCC are now working together to develop a new joint 'Sustainable Design and Construction SPD', which will cover the whole Greater Cambridge area and provide updated technical guidance to support those policies within CCC and SCDC's latest respective local plans. Whilst currently in draft format, once adopted the SPD will become a material planning consideration in the determination process.

2.2.14. In 2010, SCDC also adopted a District Design Guide SPD[12] to support the previously adopted Development Plan Documents. Whilst these have now been superseded by the 2018 Local Plan, this SPD is still a material planning consideration. Chapter 10 of the SPD relates to air quality and outlines the requirements for the preparation of a Low Emission Strategy (LES) i.e. a package of measures to help mitigate transport impacts on local air quality and climate change. This may include for example implementation of travel plans/travel planning measures, public transport enhancements etc, which can be secured through planning conditions and legal obligations. The requirement for LESs for major developments will also be incorporated into the abovementioned Draft Sustainable Design and Construction SPD.

[11] CCC (June 2007) Sustainable Design and Construction SPD

[12] South Cambridgeshire District Council. District Design Guide SPD (Adopted March 2010).

3. METHODOLOGY

3.1.1. The air quality constraints review has included the following tasks:

- Review of SCDC's and CCC's latest review and assessment reports and available air quality data, including: CCC (2019) 2019 Air Quality Annual Status Report [13]; and SCDC's (2019) South Cambridgeshire District Council 2019 Air Quality Annual Status Report[14];
- Review of relevant data, including background pollutant maps and monitoring data, available from Defra's online Local Air Quality Management (LAQM) support pages[15] and their UK-Air Resource[16];
- Review of local mapping data to identify surrounding land uses and sensitive receptors, including consideration of the Multi-Agency Geographic Information for the Countryside (MAGIC) website[17];
- Identification of the key air pollutant sources near to the Site, taking into consideration information relating to authorised processes that generate emissions to air available from the Environment Agency's online pollution register[18] and CCC's and SCDC's public registers for authorised processes (where available); and,
- Consideration of the likely access arrangements for the Site, and the potential volume and routing of development related traffic.

3.1.2. A consultation request was also submitted to the Environmental Health Officers (EHOs) at CCC and SCDC to identify any specific concerns they had regarding the development proposals and air quality, and to confirm the presence of any existing pollutant sources in the vicinity of the Site. However, they declined to comment at this time.

[13] Cambridge City Council. 2019 Air Quality Annual Status Report (ASR) (June 2019). [accessed 27.09.19].

[14] South Cambridge District Council. South Cambridge District Council 2019 Air Quality Annual Status Report (ASR) (June 2019). [accessed 27.09.19].

[15] Department for Environment, Food and Rural Affairs. Local Air Quality Management (LAQM) Support/ https://laqm.defra.gov.uk/ [accessed 27.09.19].

[16] Department for Environment, Food and Rural Affairs. UK Air: Air Information Resource. https://uk-air.defra.gov.uk/data/ [accessed 27.09.19].

[17] MAGIC (2016) www.magic.gov.uk/MagicMap.aspx [accessed 27.09.19].

[18] Environment Agency. Public Registers. https://environment.data.gov.uk/public-register/view/index [accessed 27.09.19].

4. BASELINE CONDITIONS

4.1. CCC'S REVIEW & ASSESSMENT OF AIR QUALITY

4.1.1. CCC currently has one AQMA in effect within their administrative area, which is located immediately east of the Site and comprises an area encompassing the inner ring road and all of the land within it, and some radial routes extending out of the city centre. This AQMA was designated in 2004 due to exceedances of the AQS objective for annual mean concentrations of NO_2, primarily attributable to exhaust emissions from road traffic.

4.1.2. Within their latest review and assessment report (the 2019 Annual Status Report (ASR)) CCC has stated that air quality has been improving in most parts of Cambridge in recent years; although there are some areas of the city where NO_2 concentrations continue to be high. With regards to PM_{10} concentrations, measured levels have remained relatively stable over recent years and are consistently well below legal limits. $PM_{2.5}$ concentrations are also low.

4.1.3. In 2017 CCC developed a new AQAP, in collaboration with the County Council and Greater Cambridgeshire Partnership. This was approved in March 2018. The AQAP sets out the how the Council intends to reduce polluting emissions within the City. The proposed measures are split into three main categories including:

- Reducing local traffic emissions as quickly as possible to meet local objectives (for example by reducing emissions from taxis through incentives to use low emission vehicles and provision of more electric vehicle charging points, reducing bus emissions by working with operator/partners to promote low emission vehicles etc, promoting more sustainable transport choices for businesses/deliveries etc);
- Maintaining levels of pollutants below national objectives (through the application of appropriate planning policies and promotion of sustainable transport); and
- Improving public health (by raising awareness of air quality and educating the public on the benefits of sustainable and active transport.

4.2. SCDC'S REVIEW & ASSESSMENT OF AIR QUALITY

4.2.1. SCDC also have one AQMA in effect within their administrative area. This is the A14 Corridor AQMA, which is located approximately 1.3km north of the Site and comprises an area along the A14 between Bar Hill and Milton, including Junction 14 of the M11. The AQMA was designated in 2008 due to likely exceedances of the statutory objectives for annual mean concentrations of NO_2 and daily mean (24-hourly) concentrations of PM_{10}.

4.2.2. However, within their 2019 ASR, SCDC has also identified that there have been significant improvements in air quality since this time such that there have been no recorded exceedances of the objectives within the AQMA for at least the last five years. It is understood that this is largely due to a number of past and ongoing improvement schemes on the A14 that have been implemented to alleviate congestion. As part of their appraisal of SCDC's LAQM work, Defra has recommended that SCDC revoke the AQMA. SCDC are currently taking this in to consideration but will continue to monitor pollutant levels within the AQMA until the A14 improvement works are completed (expected to be in 2020).

4.2.3. SCDC's actions to improve local air quality that were undertaken last year included:

- Preparation of the new joint Sustainable Design & Construction SPD to support the new Local Plan (see Paragraph 2.2.13);
- Efforts to secure LES's for major developments with the use of planning conditions and site specific SPDs; and,
- Installation of a new $PM_{2.5}$ monitor at Orchard Park School near the A14.

4.3. LOCAL EMISSION SOURCES

4.3.1. The Site is located in an area where air quality is mainly influenced by emissions from road transport. There are a number of key roads in the vicinity of the Site that will influence concentrations within the Proposed Development. The dominant pollutant sources will be the M11, which is a four-lane motorway, running parallel to the western site boundary, and the A603 Barton Road, which borders the site along the southern boundary. The A1303 Madingley Road is also located approximately 0.5km north of the Site and the A1134 approximately 0.4km east of the Site. Madingley Road Park and Ride is located approximately 500m north of the site boundary.

4.3.2. A review of the Environment Agency's Environmental Permit Public Register[19], indicates that there are no large scale industrial processes located within the vicinity[20] of the Site that are likely to have a significant influence on conditions within the Site.

4.3.3. Furthermore, a review of CCC's and SCDC's public registers for authorised processes, indicates that there are no local authority controlled processes located nearby that are likely to influence conditions within the Site.

4.3.4. Agricultural activity in the area may be a source of emissions of particulates from livestock housing and soil tilling, and of nitrogen based compounds from livestock farming but these are not expected to be significant.

4.4. DEFRA BACKGROUND POLLUTANT CONCENTRATIONS

4.4.1. Background concentrations of NO_2, PM_{10}, and $PM_{2.5}$ relevant to the Site have been obtained from the Defra website, where estimated concentrations of the key pollutants included within the AQS have been mapped at a grid resolution of 1km x1km for the whole of the UK, for all years between 2017 and 2030. 2019 concentrations relevant to the area of the Site are summarised in Table 1.

[19] https://environment.data.gov.uk/public-register/view/search-industrial-installations

[20] Within a 3km radius

Table 1 - Defra Background Concentrations Relevant to the Site (µg/m^3)

Grid Square (centre on O.S. Grid Reference)	2019 Annual Mean Concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
542500, 258500	11.39	16.98	10.26
543500, 258500	10.75	14.90	9.52
543500, 257500	10.46	15.03	9.56
542500, 256500	10.89	17.57	10.26
542500, 257500	10.50	16.58	9.93

4.4.2. The background concentrations summarised above are below the respective objective levels for all pollutants considered.

4.4.3. It should be noted that the background maps represent estimates of actual background concentrations for a given location, that is the contribution to total pollutant concentrations at that location that has been transported in (by the wind) from the surrounding area and more distant sources, and does not take into account the influence of specific local sources.

4.5. CCC LOCAL AUTHORITY AIR QUALITY MONITORING DATA

4.5.1. CCC currently undertake monitoring within their area using a combination of five automatic monitoring stations and 71 passive diffusion tubes. However, none of these monitoring stations are located within the immediate vicinity of the Site.

4.5.2. Recent results from those automatic monitors located within a 2km radius of the Site are summarised in Table 2. These monitoring sites are located at roadside locations within the centre of Cambridge and are likely to be affected by high traffic volumes and periods of congestion. Therefore, whilst they may not be representative of conditions within the Site itself they will provide an indication of pollutant concentrations in the wider area and any trends in local air quality.

Table 2 - CCC Nearby Automatic Monitoring Results

Site ID	Distance from Site (km)	Pollutant	Monitored Concentration (µg/m^3) / Result*				
			2014	2015	2016	2017	2018
CM1 Gonville Place	1.6	Annual Mean NO_2 (µg/m^3)	37	35	36	31	30

Site ID	Distance from Site (km)	Pollutant	Monitored Concentration (µg/m^3) / Result*				
			2014	2015	2016	2017	2018
Roadside 545508,257828		NO_2 1-hour Mean >200µg/m^3	0	2	0	0	0
		Annual Mean PM_{10} (µg/m^3)	19	21	20	18	19
		PM_{10} 24hr Mean >50µg/m^3	5	2	1	3	1
CM4 Parker Street Roadside 545366,258391	1.4	Annual Mean NO_2 (µg/m^3)	**45**	**45**	**41**	37	32
		NO_2 1-hour Mean >200µg/m^3	0	0	0	0	0
		Annual Mean PM_{10} (µg/m^3)	22	23	22	21	23
		PM_{10} 24hr Mean >50µg/m^3	5	4	4	4	1
CM5 Regent Street Roadside 545289,258118	1.3	Annual Mean NO_2 (µg/m^3)	39	34	32	29	26
		NO_2 1-hour Mean >200µg/m^3	0	0	0	0	0
*Any exceedances of the respective objectives are highlighted in **bold** text.							

4.5.3. The results in Table 2 show that for the last two years, the objectives for NO_2 have been met at all monitoring locations within a 2km radius. Furthermore, the data indicates an overall downward trend in annual mean NO_2 concentrations over the last five years, for which data is presented. With regards to PM_{10}, measured concentrations are also well below the respective objectives. PM_{10} concentrations have remained fairly stable over recent years, although they have shown a slight increase in 2018 (compared to 2017). Within their 2019 ASR, CCC have hypothesised this may be due to an increase in older buses within the city centre.

4.5.4. Similarly, CCC do not currently undertake any diffusion tube monitoring within the immediate vicinity of the Site. However, recent results from those tubes located within a 2km radius are presented in Table 3.

Table 3 - CCC NO_2 Monitoring Results

Site ID	Site Type	Distance to Site (km)	Annual Mean NO_2 Concentration (µg/m^3)*				
			2014	2015	2016	2017	2018
DT3	Roadside	1.0	30	28	27	21	22
DT4	Roadside	1.0	39	38	37	33	31
DT5	Roadside	0.8	36	33	34	29	26
DT9	Roadside	1.3	35	32	31	25	28
DT11	Background	1.8	13	12	13	10	10
DT15	Roadside	1.7	37	35	36	31	n/a
DT16	Roadside	1.3	33	34	30	29	26
DT18	Roadside	0.9	**43**	39	36	34	30
DT19	Roadside	1.6	23	27	23	21	20
DT21	Roadside	1.5	**33**	30	28	25	24
DT22	Kerbside	0.7	**40**	38	37	33	30
DT23	Roadside	1.2	25	24	23	19	17
DT24	Kerbside	1.4	32	35	29	29	24
DT25	Roadside	0.8	20	22	22	19	19
DT26	Roadside	1.2	24	23	22	19	19
DT31	Roadside	0.9	**44**	**42**	33	31	31
DT33	Roadside	1.8	**40**	38	37	35	35
DT34	Roadside	1.4	**40**	39	39	32	22
DT39	Kerbside	1.8	33	34	32	28	30
DT40	Roadside	1.5	**40**	**42**	39	33	34
DT41	Roadside	1.2	38	34	36	28	31
DT42	Roadside	1.0	26	26	27	24	20
DT45	Roadside	1.2	**42**	**40**	37	33	33
DT46	Roadside	1.6	25	23	25	23	23
DT47/48/49	Roadside	1.6	37	36	35	31	31
DT64	Roadside	1.2	-	-	-	-	24

*Exceedances of the annual mean objective (40µg/m^3) are highlighted in **bold** text.

4.5.5. The data in Table 3 generally supports the automatic data in Table 2 and indicates that there has been an overall reduction in NO_2 concentrations over recent years such that no exceedances of the

annual mean objective (40µg/m^3) have been recorded at the identified sites since for the last three years.

4.5.6. As noted previously, there are no tubes located within the immediately vicinity of the Site itself. The two tubes most relevance to the Site itself are tubes DT22, which is located on Madingley Road 0.7km north of the Site, and DT 25, which is located on Barton Road, 0.8km east of the Site. Concentrations measured at these two locations were ≥ 25% below the objective in 2018.

4.5.7. At illustrated on Figure 1, the diffusion tubes are primarily located to the east and northeast of the Site, in the centre of Cambridge and close to the arterial roads leading into Cambridge. They are not therefore representative of conditions within the Site itself and unfortunately do not provide any indication of pollutant concentrations near to the M11 or to the west of the Site. Given the volume of traffic likely to be using the M11, NO_2 concentrations are expected to be elevated near to the motorway.

4.6. SCDC LOCAL AUTHORITY AIR QUALITY MONITORING DATA

4.6.1. SCDC also undertake monitoring within their administrative area using a combination of three automatic monitoring stations and 27 passive diffusion tubes. However, none of these monitoring sites are located within the immediate vicinity of the Site. The nearest automatic station is a roadside monitor on Huntingdon road in Girton, located approximately 1.9km north of the Site. As illustrated in Table 4 below, recent results from this monitor show that for both NO_2 and particulate matter, measured concentrations have remained well below the respective objectives for the last five years. Furthermore, the data suggests an overall downward trend in NO_2 concentrations, in keeping with the findings of CCC, and relatively stable PM_{10} and $PM_{2.5}$ concentrations.

Table 4 – SCDC nearby Automatic Monitoring Data

Site ID & Type	Distance to Site (km)	Pollutant	Monitored Concentration (µg/m^3) / Result				
			2014	2015	2016	2017	2018
GIRT Roadside 542676,260667	1.9	Annual Mean NO_2 (µg/m^3)	25	24	23	23	18
		NO_2 1-hour Mean >200µg/m^3	0	0	0	0	0
		Annual Mean PM_{10} (µg/m^3)	16	11	17	17	17
		PM_{10} 24hr Mean >50µg/m^3	2	1	1	1	1
		Annual Mean $PM_{2.5}$ (µg/m^3)	12	11	13	11	11

4.6.2. SCDC do not undertake any diffusion tube monitoring within a 2km radius of the Site. The nearest monitoring is undertaken within the AQMA, adjacent to the A14 between Bar Hill and Orchard Park and Junction 14 of the M11.

4.6.3. However, as noted in paragraph 4.2.2, SCDC have confirmed within their latest review and assessment report that there have been significant improvements in air quality over recent years such that the respective air quality objectives have been met at all locations, including within the AQMA, for the last five years.

4.7. EXISTING SENSITIVE RECEPTORS

4.7.1. Sensitive locations are places where the public or sensitive ecological habitats may be exposed to pollutants resulting from activities associated with the Site. These will include locations sensitive to an increase in dust deposition and PM_{10} exposure as a result of on-site construction activities, and locations sensitive to exposure to airborne pollutants emitted from the exhausts of construction vehicles and plant and from traffic associated with operational phase of the future development.

4.7.2. Locations with a high sensitivity to dust and particulates from construction would include residential properties, museums, long-term car parks and car show rooms. Locations considered to be of moderate sensitivity would include parks and places of work and those with a low sensitivity would include playing fields, farmland (unless commercially sensitive horticulture), short-term car parks, roads etc.

4.7.3. In terms of locations sensitive to pollutants emitted from engine exhausts, these will include locations where members of the public will be regularly present for the times prescribed within the AQS. For example, on a footpath or retail area, where exposure will be transient, it will be most appropriate to consider exposure against the short-term standards (e.g. the hourly mean). At a school or residential dwelling, where people will stay for extended periods of time, it may be more appropriate to consider the long-term standards (e.g. annual mean and daily mean) which are typically lower concentrations. Box 1.1 of Defra LAQM Technical guidance (LAQM.TG16)[21] provides examples of locations where the objectives should or should not apply.

4.7.4. Some air pollutants will also have an effect on vegetation, typically either through deposition of dust or particles to the plant surface, which can directly affect plant health and productivity, or the deposition of pollutant to the ground, which can affect the soil characteristics and nitrogen availability and subsequently plant health.

HUMAN RECEPTORS

4.7.5. The key existing human sensitive receptors near to the Site include:

- A number of university, college and school buildings located to the immediate north and east of the Site; and,
- Surrounding residential areas, including in particular those properties located in Newnham, immediately east and northeast of the Site boundary, properties within the Central Cambridge (including the AQMA), properties to the north beyond Madingley Road, isolated farm houses (e.g. Haggis Farm Cottages, Springfield and Wheatcases to the south west, and properties within Coton village (approximately 400m west of the Site).

[21] Department for Environment, Food and Rural Affairs (Defra) (2016) Local Air Quality Management Technical Guidance (TG16)

4.7.6. All of these receptors will be sensitive to changes in air quality during both the construction and operational phases of the Proposed Development.

ECOLOGICAL RECEPTORS

4.7.7. There are no Special Protection Areas (SPA), possible SPAs, Special Areas of Conservation (SAC), possible SACs, Ramsars or proposed Ramsars within a 5km radius of the Site.

4.7.8. However, the following Sites of Special Scientific Interest (SSSI) have been identified:

- Madingley Wood SSSI – located approximately 2km northwest of the Site. Designated as an example of ash-maple woodland type (characteristic of the chalky Boundary Clay of eastern England) and the presence of ancient woodland;
- Traveller's Rest Pit SSSI – located approximately 1km north of the Site. Designated due to the presence of unique exposure if fossiliferous cold stage gravels, sands and silts of a high-level terrace (Observatory Gravels); and
- Histon Road SSSI – located approximately 2.7km north-northeast of the Site. Designated as a geological review site (as a key Pleistocene Stratigraphic site).

4.7.9. The Traveller's Rest Pit and Histon Road SSSIs have been designated for their geological interest. They are therefore unlikely to contain features that would be sensitive to a change in local air quality and are not expected to pose a constraint to development of the Site. However, the Madingley Wood SSSI may include features/habitats that would be sensitive to a change in local air quality. As described within guidance published by Defra (LAQM.TG16) and Highways England[22], such receptors may also be affected by an increase in pollutant concentrations in the air (notably oxides of nitrogen) and an increase in the direct deposition of pollutants to the ground and on plant surfaces (notably nitrogen deposition). This SSSI is located immediately adjacent to the A1303 and therefore could be affected by the development proposals, if development traffic is distributed onto this road link.

[22] Highways England (formerly the Highways Agency) (2007) Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1, HA 207/07 Air Quality

5. POTENTIAL AIR QUALITY CONSTRAINTS

5.1. CONSTRUCTION PHASE

5.1.1. During the construction phase, potential air quality effects relating to the Proposed Development are considered likely to include the following:

- Releases of dust and particulate matter during earthworks, construction activities and trackout; and
- Increases in local concentrations of NO_2, PM_{10} and $PM_{2.5}$ due to exhaust emissions from construction plant and vehicles.

5.1.2. The Institute of Air Quality Management (IAQM) has published guidance[23] on the assessment of dust impacts arising from demolition and construction activities. It takes into account the nature and scale of the activities undertaken for each key source (i.e. demolition, earthworks, construction and track out) and the sensitivity of the surrounding area to an increase in dust and PM_{10} levels to assign a level of risk which is subsequently used to identify appropriate site-specific mitigation measures. The IAQM guidance goes on to provide a detailed list of recommended mitigation measures for each stage of works.

5.1.3. The IAQM recommends an assessment is undertaken where there are:

- Human receptors within 350m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or
- Ecological receptors within 50m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

5.1.4. Given the size of the Site, the likely level of works required to develop the Site and the presence of a number of 'human receptors' within the defined distances, a construction dust assessment and mitigation strategy will be required in support of any planning application.

5.1.5. However, the IAQM guidance states that with the application of effective mitigation, significant effects related to dust and PM_{10} should be prevented and therefore the residual effects are likely to be negligible.

5.1.6. Exhaust emissions from construction vehicles and plant may also have an impact on local air quality, particularly adjacent to the routes used by these vehicles to access the Site and in the vicinity of the Site itself; however, such impacts are likely to be temporary for the duration of the construction phase and will not result in any long-term changes in air quality. Depending on the number and type of construction vehicles, detailed modelling may be required to assess these emissions. There are also mitigation measures that can be implemented to help minimise the associated impacts, for example, careful timing of construction movements, to avoid peak periods of congestion, and careful routing of the traffic on the local network, to avoid sensitive receptors where possible.

[23] Institute of Air Quality Management (2016) *Guidance on the assessment of dust from demolition and construction V1.1 (updated 2016)*

5.1.7. To summarise, provided an assessment is undertaken in line with current best practice guidance and suitable mitigation measures are identified and implemented at the Site for the duration of works, there should be no air quality constraints during the construction phase.

5.2. OPERATIONAL PHASE

CONSTRAINTS ARISING FROM EXISTING AIR QUALITY AND POLLUTANT SOURCES

5.2.1. The development of the Site for mixed-use will introduce new sensitive receptors into the local area, including residential receptors and schools.

5.2.2. The Site does not currently lie within an existing AQMA. However, this will primarily be due to the current absence of relevant exposure rather than an indication that pollutant concentrations are compliant with the statutory objectives.

5.2.3. Based on the findings of this initial desk-study it is anticipated that air quality will be acceptable for much of the Site however there is the potential for exceedances of the objectives to occur along the western and southern edges of the Site near to the motorway. The M11 and A603 therefore pose a constraint to the development of the Site as they may affect the either the extent of the developable area or the land uses that would be considered acceptable in the areas nearest to these roads. It is expected than an air quality buffer will therefore be required along the M11 to provide separation between the road and the most sensitive land uses, and to ensure that future site users/occupants are not exposed to unacceptable levels of air pollution. However, in the absence of appropriate monitoring data and/or completion of a detailed modelling exercise, it is not currently possible to determine where exceedances are likely to occur. Further work will therefore be required to confirm the extent and width of such a buffer.

CONSTRAINTS ARISING FROM THE PROPOSED DEVELOPMENT

5.2.4. During the operational phase, the Proposed Development has the potential to generate new vehicle movements on the local road network. Exhaust emissions from these vehicles will result in long-term changes in local air quality (i.e. concentrations of NO_2, PM_{10} and $PM_{2.5}$) and may therefore affect sensitive receptors located near to the Site and in those areas close to roads used by development related traffic, including locations within the nearby AQMAs.

5.2.5. Where on-site energy generating plant is included within the development proposals (e.g. CHP plant, large boilers, biomass etc), the associated emissions to air may also have an adverse effect on local air quality, and specifically on NO_2 concentrations.

5.2.6. Environmental Protection UK (EPUK) and the IAQM have published a document 'Land-Use Planning and Development Control: Planning for Air Quality'[24] that provides comprehensive guidance on how to determine: when an air quality assessment is likely to be required; what should be included in the assessment; the significance of any identified air quality impacts associated with a

[24] Environmental Protection UK & Institute of Air Quality Management

development; and, the possible mitigation measures that may be implemented to minimise these impacts.

5.2.7. The guidance advises that development may result in a potentially significant impact on air quality, and therefore require a detailed assessment, where trip generation exceeds the following criterion:

- A change of Light Duty Vehicles (LDV) flows of more than 100 Annual Average Daily Traffic movements (AADT) and/or an increase in Heavy Duty Vehicles (HDVs) of ≥25 AADT within or adjacent to an AQMA; or
- A change in LDV flows of more than 500 Annual Average Daily Traffic flows (AADT) and/or an increase in HDV flows of ≥100 AADT outside of an AQMA.

5.2.8. Given the Site is located immediately west of the Cambridge AQMA, the more stringent of these criteria will be applicable.

5.2.9. The exact quantum of development has yet to be confirmed, therefore the trip generation and distribution associated with the Site is not currently known. However, given the nature and potential scale of the proposals, the Proposed Development will undoubtedly generate considerably more than 100 LDVs and 25HDVs. The majority of development traffic is expected access the Site via the A603 Barton Road and Madingley Road and may therefore travel into the Cambridge AQMA. An element of development traffic is also likely to distribute onto the M11.

5.2.10. The impact of development generated traffic could therefore pose a constraint to the development if it results in a significant increase in pollutant concentrations at nearby sensitive receptors or a significant worsening of air quality in an area of existing poor air quality (which would contravene the aims of SCDC/CCC's AQAPs).

5.2.11. However, a range of mitigation measures will be incorporated into the Proposed Development to ensure that impacts on air quality are prevented and/or minimised as far as possible. These recommended measures are detailed in the following section.

MASTERPLAN DESIGN

5.2.12. As noted previously, the M11 is likely to represent the primary influence on air quality within the Site. It is also understood to represent the dominant noise source. In order to provide some separation between the motorway and the proposed sensitive receptors, and therefore reduce the potential for future occupants to be exposed to elevated pollutant concentrations (and noise levels), the masterplan has been designed to include a buffer along the western edge of the Site. The proposed buffer extends 250metres into the Site from the edge of the M11 and takes the form of a landscaped linear park, with woodland planting and earth bunds. A copy of the proposed masterplan is provided in Appendix B for information.

5.2.13. To date, the extent of the M11 buffer has largely been driven by the mitigation requirements for acoustics. The specific requirements for air quality will need to be confirmed through detailed modelling (and potentially monitoring) undertaken in support of any future planning application.

5.2.14. However, in line with guidance published by Highways England's[25], it is generally accepted that the influence of road traffic emissions on local pollutant concentrations reduces rapidly as the distance from the road increases. The greatest reduction is usually experienced within the first 50 metres and is typically negligible at distances beyond 200 metres. On this basis, and taking into account the works completed to date, a buffer of 250m is therefore expected to exceed the requirements for air quality.

5.2.15. It should be noted that from an air quality perspective, the required 'buffer' is most likely to relate to high sensitivity uses such as residential receptors, schools and health care facilities. Less sensitive uses such as sports fields, commercial buildings and retail units are likely to be considered acceptable land uses within the 'buffer' as public exposure is for a shorter time (and therefore they are permitted to experience higher pollutant concentrations) but again further work would be required to confirm this.

5.2.16. The A603 Barton Road will also influence pollutant concentrations within the Site, albeit to a lesser extent. Where practicable, residential properties will also be set back slightly from this road link. Existing screening (woodland planting) will also be retained between the Site and Barton Road.

5.2.17. The Site is located in a highly accessible location and is well positioned with regards to a number of proposed transport infrastructure projects including the CAM metro and the Cambourne to Cambridge High Quality Bus Route. For the operational phase, measures will therefore be put in place to encourage the use of active and sustainable modes of transport and reduce reliance on single-occupancy vehicle movements, which will be highly beneficial to air quality. This will include, for example, provision of Travel Information Packs for all new occupants, details of available Electric Vehicle Charging (EVC) facilities within the surrounding areas, Travel Information board/s within public areas of the Site, creation and/or promotion of car-sharing and cycling clubs; and enabling access to high speed internet to support working and shopping from home.

5.2.18. In addition, the masterplan has been designed to provide connectivity to the surrounding area and promote walking and cycling. A number of new pedestrian links and cycle routes are proposed within the Site, which will connect with key routes at the site boundary.

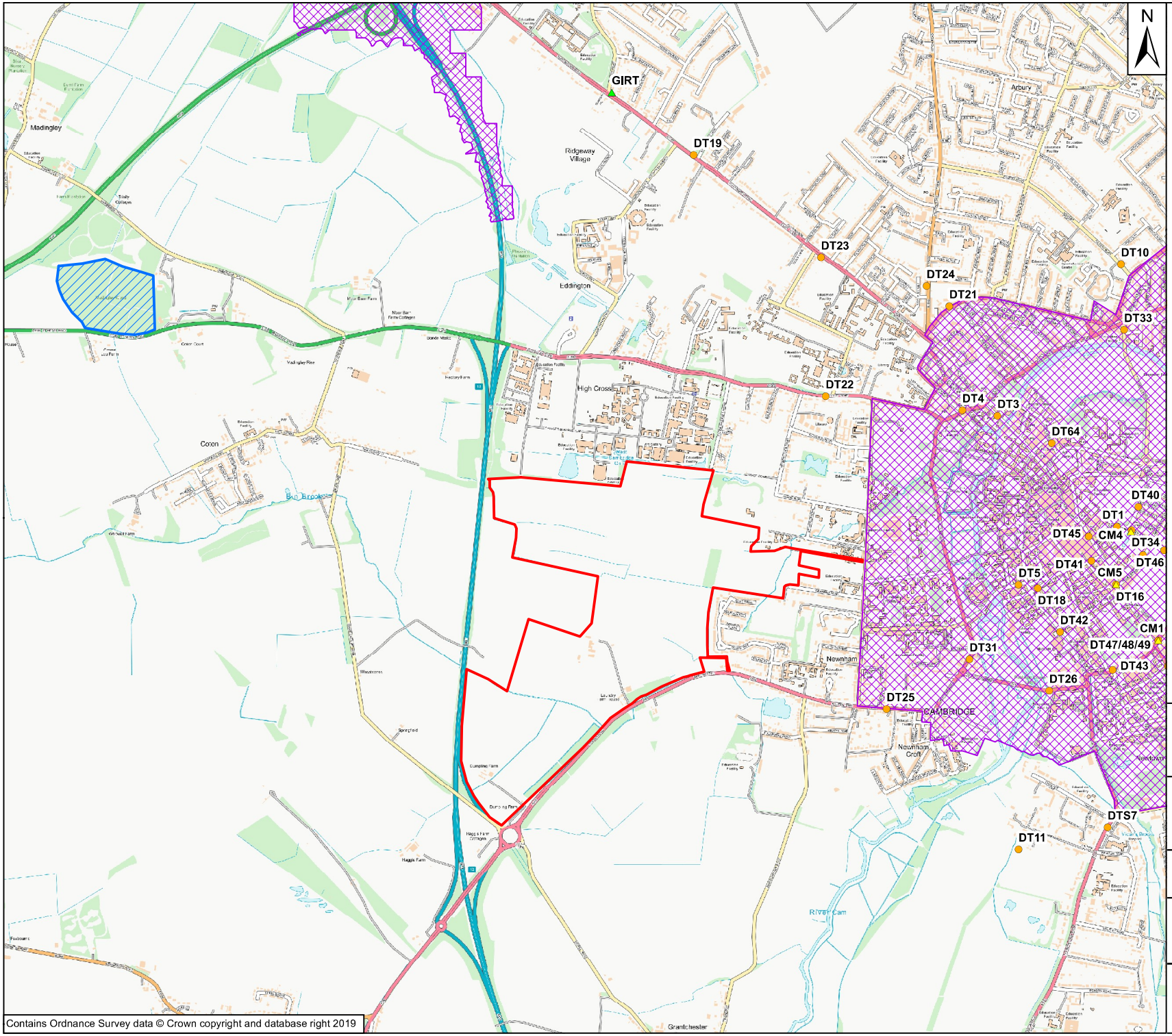
5.2.19. Consideration should also be given to the following, where appropriate:

- Buildings should be configured to avoid the creation of 'Street Canyons', which can inhibit effective pollutant dispersion (e.g. an example of a 'street canyon' could include a relatively narrow street within a continuous block of 3+storey terrace/town houses either side of the road. The buildings act as barriers to the wind and essentially trap pollutants within the street).
- For properties fronting onto the A603 Barton Road, consideration should also be given to locating/orientating the most sensitive rooms (i.e. habitable rooms / bedrooms) away from the road where possible.

[25] Highways England (2007) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1: Air Quality HA207/07

- Any proposed combustion sources should be located away from existing and proposed sensitive receptors where possible and include appropriately sized chimney stacks or vents. CHP plant should also meet the minimum emission standards set out in the local planning policy.
- The masterplan should ensure areas of safe and secure cycling parking are provided within the Site.
- EVC points should also be provided throughout the development to encourage the use of zero and low-emission vehicles. The type and number of charging points should be compliant with local planning policy requirements.
- The presence of additional tall trees and vegetative screening within the buffer, along the A603, and adjacent to proposed internal access roads, may also provide a small benefit for air quality.

5.2.20. With the implementation of above measures, it is anticipated the development of the Site for the proposed end uses will be acceptable with regards to local air quality.



Key:

- Site Location
- AQMAs
- CCC Automatic Monitors
- CCC Diffusion Tubes
- SCDC Automatic Monitors
- SCDC Diffusion Tubes
- Madingley Wood SSSI

wsp

Client: North Barton Land Owners Group

Project: Land North of Barton Road

Title: Site Location Plan

Drawing No: Figure 1
Date: October 2019
Scale: 19,000 @ A3
Drawn: FC
Checked: JC
Approved: JC

User Name: UKFLC001 | Date Saved: 14/10/2019 17:43:32
Document Path: C:\Modelling Files\NBRLOG\NBRLOG AQ.mxd

Appendix A

RELEVANT AIR QUALITY STANDARDS AND OBJECTIVES

National Air Quality Objectives and European Directive Limit Values for the protection of human health

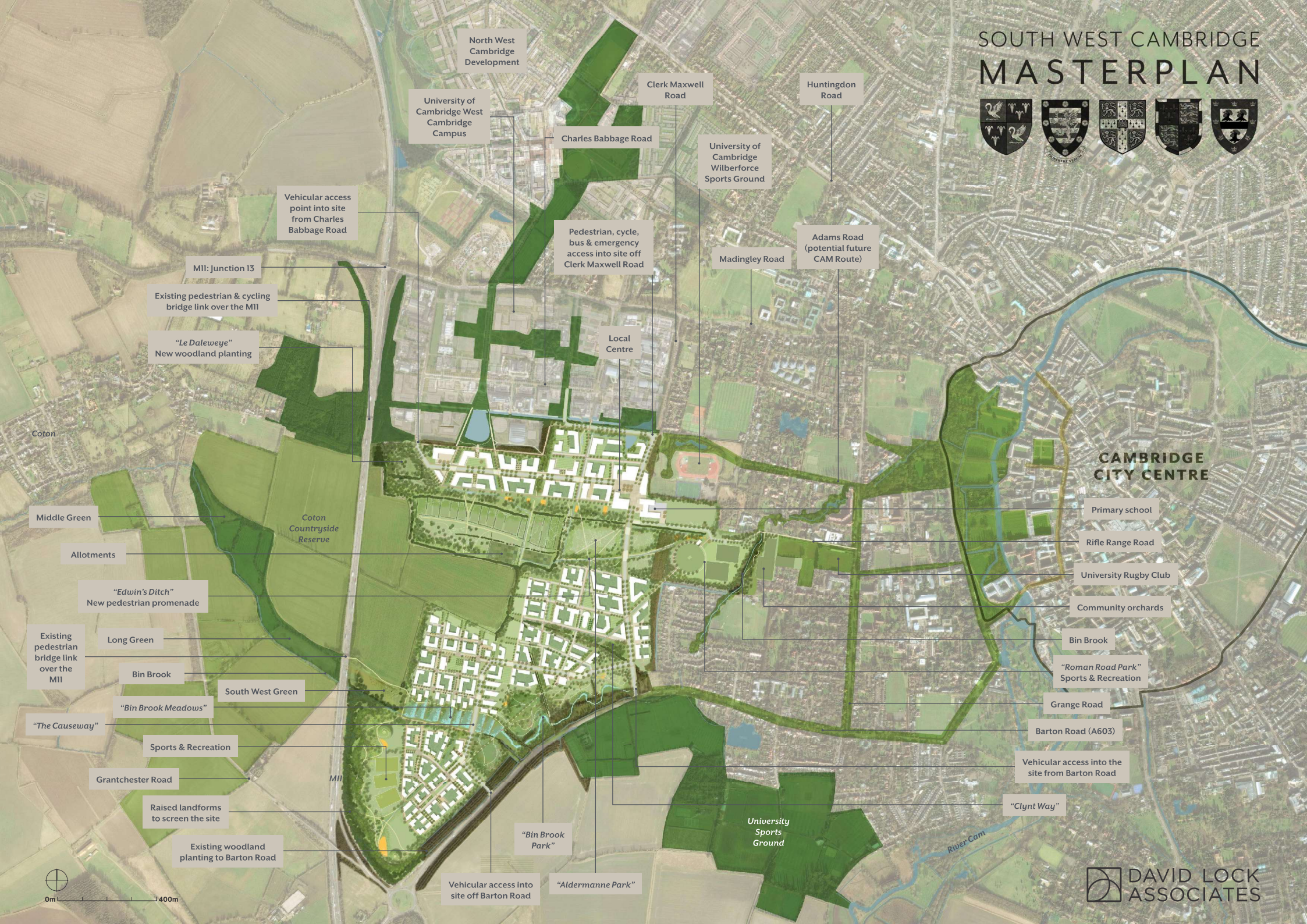
Pollutant	Applies to	Objective	Measured as	Date to be achieved by and maintained thereafter	European Obligations	Date to be achieved by and maintained thereafter
Nitrogen dioxide (NO_2)	UK	200µg/m^3 not to be exceeded more than 18 times a year	1 hour mean	31.12.2005	200µg/m^3 not to be exceeded more than 18 times a year	01.01.2010
	UK	40µg/m^3	annual mean	31.12.2005	40µg/m^3	01.01.2010
Particulate Matter (PM_{10}) (gravimetric)[A]	UK (except Scotland)	40µg/m^3	annual mean	31.12.2004	40µg/m	01.01.2005
	UK (except Scotland)	50µg/m^3 not to be exceeded more than 35 times a year	24 hour mean	31.12.2004	50µg/m^3 not to be exceeded more than 35 times a year	01.01.2005
Particulate Matter ($PM_{2.5}$)	UK (except Scotland)	25µg/m^3	annual mean	2020	Target value 25µg/m^3	2010

[A] Measured using the European gravimetric transfer sampler or equivalent

µg/m_3 = microgram per cubic metre

Appendix B

PROPOSED MASTERPLAN


SOUTH WEST CAMBRIDGE
MASTERPLAN
North West Cambridge Development
University of Cambridge West Cambridge Campus
Clerk Maxwell Road
Huntingdon Road
Charles Babbage Road
University of Cambridge Wilberforce Sports Ground
Vehicular access point into site from Charles Babbage Road
Pedestrian, cycle, bus & emergency access into site off Clerk Maxwell Road
Adams Road (potential future CAM Route)
Madingley Road
M11: Junction 13
Existing pedestrian & cycling bridge link over the M11
"Le Daleweye" New woodland planting
Local Centre
Coton
CAMBRIDGE CITY CENTRE
Middle Green
Coton Countryside Reserve
Primary school
Allotments
Rifle Range Road
"Edwin's Ditch" New pedestrian promenade
University Rugby Club
Community orchards
Existing pedestrian bridge link over the M11
Long Green
Bin Brook
"Roman Road Park" Sports & Recreation
Bin Brook
South West Green
"Bin Brook Meadows"
Grange Road
"The Causeway"
Barton Road (A603)
Sports & Recreation
Vehicular access into the site from Barton Road
Grantchester Road
M11
"Clynt Way"
Raised landforms to screen the site
University Sports Ground
"Bin Brook Park"
River Cam
Existing woodland planting to Barton Road
Vehicular access into site off Barton Road
"Aldermanne Park"
0m
400m
DAVID LOCK ASSOCIATES