ENVIRONMENTAL CONSULTANTS

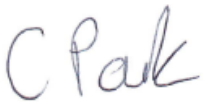
Report for:

London Borough of Camden

Tybalds Estate, Camden

Air Quality Assessment

Status: Final **Date: 01.06.2021**

Author	 Christine Park Senior Environmental Consultant
Reviewed & Approved By	 Graham Parry Managing Director
Report For	**London Borough of Camden** 2nd Floor 33-35 Jamestown Road London NW1 7DB
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1. INTRODUCTION

ACCON UK Limited (ACCON) has been commissioned by the London Borough of Camden to carry out an Air Quality Assessment including a Dust Impact Assessment for a development scheme at Tybalds Estate, London.

The Air Quality Assessment is required to support a planning application for 56 new residential units, community space/facilities, new entrances to the existing tower blocks and a lift to the Devonshire block, and a bulky waste store. The site is located within the administrative boundary of the London Borough of Camden (LBC).

This assessment has been completed in order to determine whether the proposed development achieves compliance against the National Air Quality Objectives (NAQOs), along with National and Local Planning Policy. The assessment has been undertaken in accordance with the Department for Environment, Food and Rural Affairs' (DEFRA) current Technical Guidance on Local Air Quality Management (LAQM.TG16.)[1] and covers the effects of local air quality on the development.

The report assesses the overall pollutant concentrations of nitrogen dioxide (NO_2) and particulates (PM_{10} and $PM_{2.5}$) at the proposed development site. A glossary of terms is detailed in **Appendix 1** and the location of the site is shown in **Section 3.1**. The development plans for the site with development receptor locations are identified in **Appendix 4.** It is intended that the proposed development will be occupied by 2025, at the earliest.

The potential air quality constraints on the development have been assessed on the basis of the findings of detailed dispersion modelling using Breeze Roads GIS Pro Version 5.1.8, which has been undertaken in the context of relevant NAQOs, emission limit values and relevant guidance.

[1] DEFRA, 2018, Local Air Quality Management Technical Guidance (TG16).

Email: enquiry@accon-uk.com ● www.accon-uk.com ● 0118 971 0000
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH

2. AIR POLLUTION POLICY CONTEXT

2.1. Legislation

2.1.1. Air Quality Strategy and Local Air Quality Management (LAQM)

Part IV of the Environment Act 1995 requires the Secretary of State to publish an air quality strategy and local authorities to review and assess the quality of air within their boundaries.[2] The latter has become known as Local Air Quality Management (LAQM), an instrument by which the Government's air quality objectives are to be achieved over a determined period of time.

The Air Quality Strategy provides the policy framework for local air quality management and assessment in the UK. It sets out air quality standards and objectives for key air pollutants which are designed to improve air quality and protect human health and the environment from the effects of pollution. These terms are defined below:

- The 'standards' are set at concentrations below which health 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 a particular 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 the costs, benefits, feasibility and practicality of achieving the standards. The air quality standards and objectives are outlined in **Appendix 2**.

As part of this LAQM role, Local authorities are required to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. Where a local authority identifies areas of non-compliance with the Air Quality Objectives[3] of pollutants of concern, and there is relevant public exposure, there remains a statutory need to declare the geographic extent of non-compliance as an Air Quality Management Area (AQMA) and to draw up an action plan detailing appropriate measures and policies that can be introduced in order to work towards achieving the objective(s).

The objectives for use by Local Authorities are prescribed within the Air Quality (England) Regulations 2000[4], and the Air Quality (England) (Amendment) Regulations 2002[5]. The AQOs for pollutants included within the Air Quality Strategy and assessed as part of the scope of this report are summarised in **Table 2.1**. The objectives for NO_2 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. It should be noted that Local Authorities in England have a flexible role in working towards reducing emissions and concentrations of $PM_{2.5}$.

[2] In 1997, the United Kingdom National Air Quality Strategy (NAQS) was published in response to the Environment Act of 1995, setting out a framework of standards and objectives for the air pollutants of most concern (SO_2, PM_{10}, NOx, CO, lead, benzene, 1,3-butadiene and tropospheric ozone), to be achieved by local authorities through a system of Local Air Quality Management (LAQM) by 2005. The aim of the strategy was to reduce the air pollutant impact on human health by reducing airborne concentrations. A review of the NAQS led to the publication of Air Quality Strategy for England, Scotland, Wales and Northern Ireland in January 2000, whilst in July 2007 was further reviewed with various amendments to the Air Quality Objectives for local authorities.
[3] Defra, 2018, Local Air Quality Management Technical Guidance (TG16)
[4] The Stationary Office (2000) Statutory Instrument 2000, The Air Quality (England) Regulations 2000, London
[5] The Stationary Office (2002) Statutory Instrument 2002, The Air Quality (England) (Amendment) Regulations 2002, London

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Table 2.1: UK Air Quality Objectives for NO_2, PM_{10} and $PM_{2.5}$

Pollutant	Objectives	Averaging Period
Nitrogen dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3 not to be exceeded more than 35 times a year	24-hour mean
	40µg/m^3	Annual mean
Particulate Matter ($PM_{2.5}$)*	Work towards reducing emissions/ concentrations of fine particulate matter ($PM_{2.5}$)	Annual mean

* The $PM_{2.5}$ objective, which is to be met by 2020, is not in (Air Quality England) Regulations and there is no requirement for local authorities to assess it, although they are encouraged to do so.

The AQS objectives apply at locations where members of the public are likely to be regularly present and exposed over the averaging period of the objective. **Table 2.2** identifies examples of where the annual mean objectives should apply as provided in LAQM.TG16[6], and include: building facades of residential properties[7], schools, hospitals, etc. The annual mean objectives are not relevant for the building facades of offices or other places of work where members of the public do not have regular access, kerbsides or gardens. The 24-hour mean objective applies to all locations where the annual mean objective would apply, together with hotels and gardens of residential properties. The 1-hour mean objective also applies at these locations as well as at any outdoor location where a member of the public might reasonably be expected to stay for 1-hour or more, such as shopping streets, parks and sports grounds, as well as bus stations and railway stations that are not fully enclosed.

Table 2.2 Examples of where AQS should be applied

Averaging Period	AQS Should Apply	AQS Should Not Apply
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of: • Residential properties* • Schools • Hospitals • Care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. • Hotels, unless people live there as their permanent residence. • Residential gardens • Kerbside sites or any other location where public exposure is expected to be short term.

[6] Such locations should represent parts of the garden where relevant public exposure is likely, for example where there are seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.
[7] Moorcroft and Barrowcliffe. et al. (2017) Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London.

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Averaging Period	AQS Should Apply	AQS Should Not Apply
24-hour and 8-hour mean	All locations where the annual mean objective would apply. • Hotels • Residential gardens	Kerbside sites or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. • Kerbside sites (e.g. pavements of busy shopping streets) • Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might spend one hour or more. • Any outdoor locations where members of the public might spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

*Such locations should represent parts of the garden where relevant public exposure is likely, for example where there are seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens, although local adjustment should always be applied.

2.1.2. Clean Air Strategy

The Clean Air Strategy 2019[8] was released in January 2019 and supersedes the policies featured in The National Air Quality Strategy. The strategy mainly deals with how to improve air quality in England but also discusses air quality policy in the devolved administrations. In comparison with the previous strategies it has a more joined-up approach, incorporating transport, domestic, industrial and agricultural emission reduction policies with a combined focus on both ambient and indoor air quality. The plan also has an emphasis on the proposal to use Clean Air Zones (CAZs) and the ULEZ (in London) to quickly bring highly polluted urban centres below the legal limits. Some of the key policies in the plan are a renewed consideration of under-used Smoke Control Areas due to the growth of highly polluting domestic wood burning stoves, new best practices being incorporated into the agricultural sector to reduce ammonia emissions (and their associated secondary particulates) and with a policy to prohibit the sale of new petrol and diesel cars by 2040. However, air quality objective limits outlined in the document are largely unchanged from the previous strategy.

2.2. Planning Policy

2.2.1. National Planning Policy

The first National Planning Policy Framework was introduced by the department of Communities and Local Government in March 2012 and was last revised in February 2019 in respect of the removal of paragraph 209a from the NPPF which in any case only related to minerals planning authorities. The

[8] DEFRA, 2019, The Clean Air Strategy 2019

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NPPF[9] "sets out the Government's planning policies for England and how these should be applied and provides a framework within which locally-prepared plans for housing and other development can be produced." It includes advice on when air quality should be a material consideration in development control decisions. Relevant sections are set out below:

Section 9 - Promoting sustainable transport:

Paragraph 103

> *"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.."*

Section 15 - Conserving and enhancing the natural environment:

Paragraph 170 Bullet point 'e':

> *"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 181:

> *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

The NPPF is accompanied by relevant planning practice guidance (PPG)[10], a web-based resource which brings together planning guidance on various topics into one place. A specific guidance in respect to air quality is provided where the guiding principles on how planning can take account of the impact of new development on air quality is included. 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*

[9] Ministry of Housing, Communities and Local Government, 2019, National Planning Policy Framework
[10] GOV.UK. (2014). Air quality. [online] Available at: https://www.gov.uk/guidance/air-quality--3 [Accessed 07 October 2020].

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Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH

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."

The PPG sets out the information that has to be considered when deciding whether an air quality assessment may be required for a planning application, stating that:

Where air quality is a relevant consideration the local planning authority may need to establish:

- *the 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- *whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*
- *whether occupiers or users of the development could experience poor living conditions or health due to poor air quality.*

It also provides guidance on options for mitigating air quality impacts, and 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. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met."

Examples of mitigation include:

- *Where air quality is a relevant consideration the local planning authority may need to establish:*
- *the 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- *whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*
- *whether occupiers or users of the development could experience poor living conditions or health due to poor air quality.*

2.2.2. The London Plan - The Spatial Development Strategy for Greater London (March 2021)[11]

This is a new London Plan (also known as a Replacement Plan). This means it is not an alteration or update to previous London Plans. This new London Plan is the third London Plan, the previous ones being the 2004 London Plan produced by former Mayor of London Ken Livingstone, and the 2011

[11] The London Plan - The Spatial Development Strategy for Greater London (March 2021) available at https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/london-plan-2021

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London Plan produced by former Mayor of London Boris Johnson. All of the other iterations of the London Plan from 2004-2016 have been alterations. This London Plan replaces all previous versions.

The Secretary of State for Housing, Communities and Local Government appointed a panel of three Planning Inspectors who conducted the Examination in Public (EiP) of the London Plan. The EiP was held in the Chamber at City Hall between 15 January 2019 and 22 May 2019, and involved over 300 organisations and individuals contributing to the discussion of 94 matters in 51 hearing sessions. In response to statements submitted by participants and to the discussions at the hearing sessions, a number of Further Suggested Changes to the Plan were suggested and a consolidated version, including all these suggested changes, was sent to the Inspectors in July 2019.

The Panel published its report in October 2019. The report concluded that the Plan provides an appropriate basis for the strategic planning of Greater London, subject to the recommendations set out. The Mayor considered these recommendations and modified the Plan accordingly. The Mayor did not accept all the Panel's recommendations and produced a statement giving reasons for why some recommendations were not accepted. This statement and a copy of the Plan were submitted to the Secretary of State in December 2019, and was laid before the London Assembly on 6 February 2020.

The Secretary of State issued formal directions to the Mayor to modify the Plan on 13 March 2020 and 10 December 2020. The Mayor made modifications to the Plan, taking account of the directions, and sent this version to the Secretary of State on 21 December 2020. The Secretary of State wrote to the Mayor on 29 January 2021 to confirm that this version contains the modifications necessary to conform with the directions. The London Plan was published on 2 March 2021.

The main policy for Air Quality in the London Plan 2021 is Policy SI1 - Improving Air Quality" within **Chapter 9 - Sustainable Infrastructure**, which states that:

Policy SI 1 - Improving air quality

A. Development Plans, through relevant strategic, site-specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.

B. To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:

1. Development proposals should not:

a. lead to further deterioration of existing poor air quality

b. create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits

c. create unacceptable risk of high levels of exposure to poor air quality.

2. In order to meet the requirements in Part 1, as a minimum:

a. development proposals must be at least Air Quality Neutral

Email: enquiry@accon-uk.com ● www.accon-uk.com ● 0118 971 0000
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b. *development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures*

c. *major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1*

d. *development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.*

C. *Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:*

1. *How proposals have considered ways to maximise benefits to local air quality, and*
2. *What measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.*

B. *In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance[12].*

C. *Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development."*

2.2.3. Local Planning Policy

The Camden Local Plan was adopted in 2017 and contains policies for development in LB Camden and the current Local Plan covers development up until 2031.

There are two policies with respect of Air Quality, these are:

Policy A1 Managing the impact of development.

The Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity.

The Council will:

[12] The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, Mayor of London, 2014

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a. *seek to ensure that the amenity of communities, occupiers and neighbours is protected;*

b. *seek to ensure development contributes towards strong and successful communities by balancing the needs of development with the needs and characteristics of local areas and communities;*

c. *resist development that fails to adequately assess and address transport impacts affecting communities, occupiers, neighbours and the existing transport network; and*

d. *require mitigation measures where necessary.*

The factors we will consider include:

e. *visual privacy, outlook;*

f. *sunlight, daylight and overshadowing;*

g. *artificial lighting levels;*

h. *transport impacts, including the use of Transport Assessments, Travel Plans and Delivery and Servicing Management Plans;*

i. *impacts of the construction phase, including the use of Construction Management Plans;*

j. *noise and vibration levels;*

k. *odour, fumes and dust;*

l. *microclimate;*

m. *contaminated land; and*

n. *impact upon water and wastewater infrastructure.*

Policy CC4 Air quality

The Council will ensure that the impact of development on air quality is mitigated and ensure that exposure to poor air quality is reduced in the borough.

The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council's Air Quality Action Plan.

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.

Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan.

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2.3. Relevant Guidance

2.3.1. Local Air Quality Management Technical Guidance (TG16)

DEFRA's Technical Guidance LAQM (TG16)[13] provides guidance in respect of the local air quality; whilst this primarily addresses LAQM activities, the guidance provides relevant methods concerning treatment and interpretation of data. The methodology in LAQM.TG16 directs air quality professionals to a number of tools published by DEFRA to predict and manage air quality. DEFRA regularly updates its Technical Guidance, with the latest LAQM Technical Guidance (TG16) published in February 2018.

2.3.2. Land-Use Planning & Development Control: Planning for Air Quality (IAQM, 2017)

This guidance[14] has been produced by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) to ensure that air quality is adequately considered in the land-use planning and development control process. This guidance, of itself, can have no formal or legal status and is not intended to replace other guidance that does have this status. This document has been developed for professionals operating within the planning system. It provides them with a means of reaching sound decisions, having regard to the air quality implications of development proposals. It also is anticipated that developers will be better able to understand what will make a proposal more likely to succeed. This guidance is particularly applicable to assessing the impacts of traffic and energy centre emissions and provides advice how to describe air quality impacts and their significance.

2.3.3. London Construction Dust Supplementary Planning Guidance

The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance (SPG) was published in July 2014. The guidance should be considered as a material planning consideration by London Borough Councils in their development of Local or Neighbourhood Planning Documents.

It recommends that Local Authorities therefore consider requesting that developers submit an Air Quality and Dust Risk Assessment when planning applications are received.

At post-application phase, it recommends that the developer should provide an Air Quality and Dust Risk Assessment summarising how demolition, earthworks, construction and trackout activities could cause dust soiling or impact on human health or environmentally sensitive receptors (see **Section 5.7).** The dust assessment procedure replicates that previously set out in the Institute of Air Quality Management's 2016 guidance on the Assessment of Dust from Demolition and Construction, but stipulates that a higher level of mitigation would be required if the effects of background PM_{10} and construction dust combined would increase ambient PM_{10} concentrations to within 10% of the annual NAQO.

The National Air Quality Objective (NAQO) annual mean for PM_{10} is 40µg/m^3 and the 24-hour mean is 50µg/m^3, which is not to be exceeded more than 35 times a year. The background maps produced by the Department of Environment, Food and Rural Affairs (DEFRA) indicate that the ambient PM_{10} concentration within the development area during 2019 is 18.75µg/m^3.

[13] DEFRA, 2018, Local Air Quality Management Technical Guidance (TG16)
[14] Moorcroft and Barrowcliffe. et al. (2017) Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London.

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As the background concentrations, which take account of road traffic, industrial and domestic emissions from the nearby area, are less than half of the annual mean NAQO for PM_{10}, it is not considered that construction dust associated with the development would elevate local PM_{10} pollutant concentrations above the NAQO.

The SPG recommends that planning conditions or Section 106 agreements could be used to inform an Air Quality and Dust Management Plan which should be submitted before works commence on site. These plans should detail the following:

- *"Confirmation of* dust *and air quality emission control measures to be implemented;*
- *Confirmation of what monitoring methods are to be implemented;*
- *From 2015, confirmation that construction standards will meet [Non-Road Mobile Machinery] standards, where possible."*

During the construction phase, the developer and planning authority should monitor demolition and construction works, reviewing and implementing control measures where required.

It recommends that all developments where construction dust risks are at least 'low' should implement monitoring mechanisms such as by reviewing "occupational exposure standards to minimise worker exposure and breaches of air quality objectives that may occur outside the site boundary", and by logging and acting upon public complaints. Further recommendations are outlined for sites where the assessed risk is greater.

2.3.4. Camden Planning Guidance – Air Quality (January 2021)

The Council has prepared the Camden Planning Guidance (CPG) on 'Air Quality' to support the policies in the Camden Local Plan 2017. The guidance is therefore consistent with the Local Plan and forms a Supplementary Planning Document (SPD) which is an additional "material consideration" in planning decisions.

2.3.5. Other Guidance Reviewed

- Camden Planning Guidance - Planning for health and wellbeing (March 2018)
- Camden's Local Area Requirements for Planning Applications (2018)
- Reducing air pollution from your building – a series of manuals for operators, designers & developers - Manual B – Minimising air pollution from new developments (Par Hill Research 2013)
- Camden Clean Air Action Plan 2019-2022

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3. SITE DESCRIPTION AND BASELINE CONDITIONS

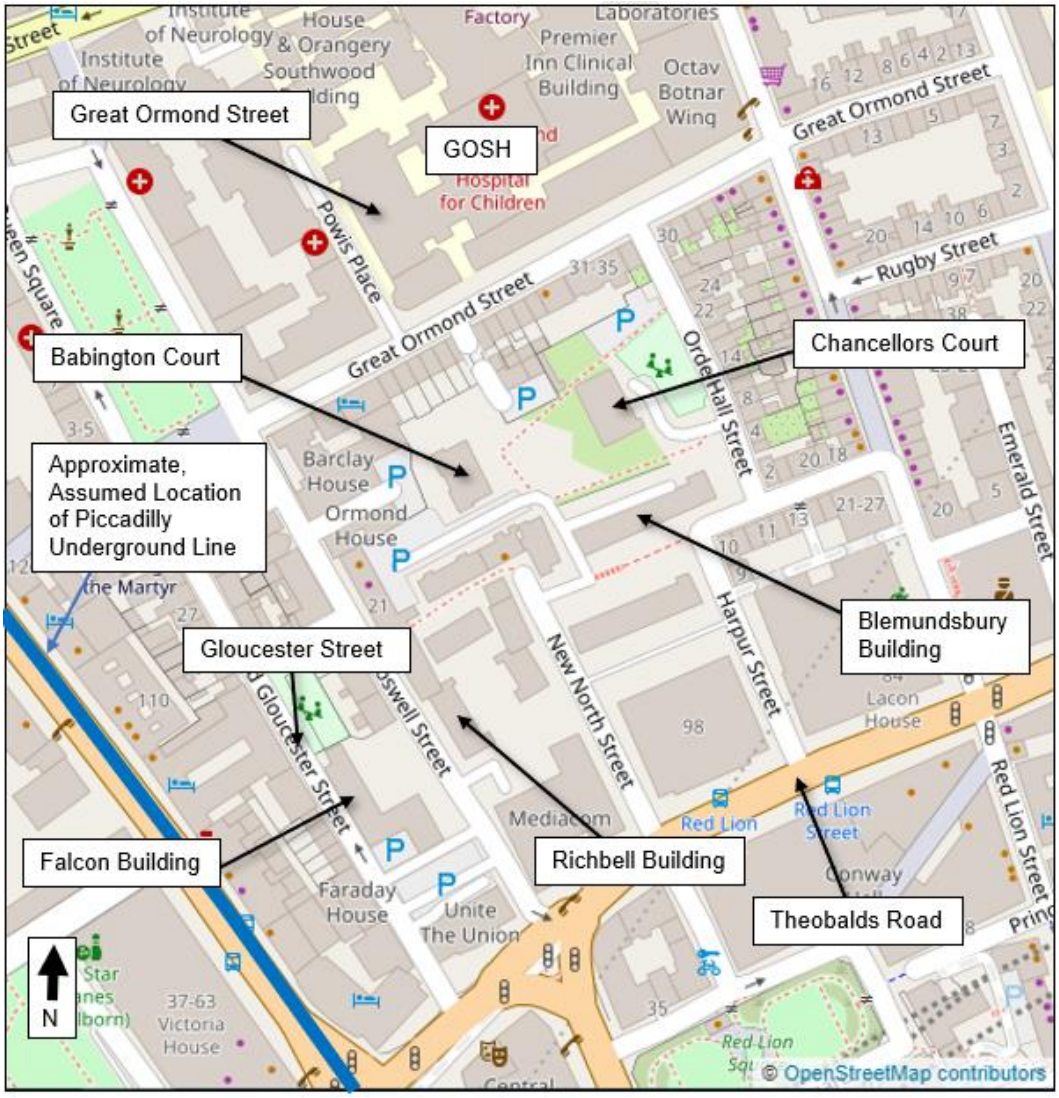
3.1. Site Description

The site is located approximately 60m to the north of the A401 Theobald's Road and approximately 25 m to the south of Great Ormond Street. The site is located within a residential area with medical facilities (such as Great Ormond Street Hospital) approximately 40m to the north of the site and large office buildings separating the existing residential area from Theobald's Road. The London Underground Piccadilly Line is located underground at a distance of approximately 50m to the west of the Falcon building.

Three new blocks of flats are proposed (Blocks B, C and D) comprising 36 new units. Two blocks of mews are proposed (eastern mews and western mews) which will comprise 10 houses. Beneath three of the existing blocks (Blemundsbury, Falcon and Richbell) an additional 10 units are proposed within the existing basement areas (underbuild). Beneath part of Falcon and at the ground floor of Block C, community facilities are proposed comprising three halls and associated facilities.

The site location is presented in **Figure 3.1** and the development plan in **Appendix 4**.

Figure 3.1: Site Location Plan



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3.2. Air Quality Review and Assessment

Local Authorities have been required to carry out a review of local air quality within their boundaries to assess areas that may fail to achieve the limit values. Where these objectives are unlikely to be achieved, local authorities must designate these areas as AQMA's and prepare a written action plan to achieve the AQS's.

Further details of the monitoring data used for model verification purposes are provided in **Section 3.3**.

3.3. Local Air Quality Monitoring

By selecting the closest appropriate roadside monitoring locations to the site, the most representative sites used for model verification purposes were identified within LBC. The monitoring locations selected were the roadside automatic monitor on Euston Road (CD9) and the diffusion tubes located on Euston Road (CA4A and CA27) and Bloomsbury Street (CA21).
These are located approximately 0.9km north and 0.6km east of the site, respectively. The annual mean NO_2 concentrations and data capture percentage were obtained from the LBC Air Quality Annual Status Report. The 2019 annual mean NO_2 concentrations for the monitoring sites are shown in **Table 3.1** below. The annual mean is exceeded at all of the monitoring sites.

Table 3.1: Local Monitoring Data Suitable for Model Verification

Location	Distance to Kerb (m)	Grid Reference		2019 Annual Mean NO_2 (µg/m^3)	2019 Data Capture (%)
		X	Y		
CD9 Euston Road	0.5	529878	182648	**70**	78.3
CA4A (New) Euston Road	0.5	530093	182792	**69.06**	91.7
CA27 Euston Road LAQN Colocation	0.5	529907	182670	**63.81**	100
CA21 Bloomsbury Street	<1	529962	181620	**48.48**	91.7

3.4. Background Concentration of Air Pollutants

Background concentrations of air pollutants for the modelling were obtained from the DEFRA pollutant concentration maps [15]. The proposed development model utilised background concentrations for 2025 based on data from a base year of 2018. ACCON has assumed that subject to planning permission being granted the first occupation of the development could occur in early 2025.

Table 3.2 identifies the background pollutant concentrations at the diffusion tube monitoring locations and at the proposed development site. All of the estimated background concentrations for annual mean NO_2 and PM_{10} used in the assessment are marginally below the AQO for the verification on Euston Road (CD9, CA4A and CA27) and the opening year at the site of 40µg/m^3 the annual mean objective limit, and marginally above for Bloomsbury Street (CA21) 2019 and 2025.

[15] DEFRA, *Background Mapping Data for Local Authorities- 2018* [online] Available at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

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Table 3.2: Background Concentrations of Pollutants

Location and Year	NO_x µg/m^3	NO_2 µg/m^3	PM_{10} µg/m^3	$PM_{2.5}$ µg/m^3
2019 - Verification for CD9 and CA27 (529500, 182500)	70.65	39.56	20.17	12.90
2019 - Verification for CA4A (530500, 182500)	69.50	39.26	20.34	12.92
2019 - Verification for CA21 (529500, 181500)	74.56	41.15	20.10	13.11
2025 - Development Receptors (530500, 181500)	66.08	35.95	18.24	11.75

Note: In 2025 the ratio between PM_{10} and $PM_{2.5}$ at the Proposed Development receptors is 0.64.

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4. METHODOLOGY OF ASSESSEMENT AND ASSESSMENT CRITERIA

4.1. Methodology

In the UK, DEFRA provides guidance on the most appropriate methods to estimate pollutant concentrations for use in Local Air Quality Management (LAQM). DEFRA regularly updates its Technical Guidance, with the latest LAQM Technical Guidance (TG16)[16] published in February 2018. The methodology in LAQM.TG16 directs air quality professionals to a number of tools published by DEFRA to predict and manage air quality. For example, it is necessary to use the updated NO_x to NO_2 calculator to derive NO_2 concentrations from the NO_x outputs from Breeze Roads modelling. This is because NO_2 concentrations within the model are otherwise predicted using the CALINE4 NO_x to NO_2 conversion methodology, which should not be used within the model as current evidence shows that the proportion of primary NO_2 in vehicle exhausts has increased since the model was developed, which would affect the relationship between NO_x and NO_2 at roadside locations.

In order to determine the extent to which air quality issues will affect the development of the site, the study has considered the following:

- Any air quality measurements carried out in the area near the proposed development; and
- The most recent Air Quality Review and Assessment Reports from LBC.

4.2. Breeze Roads Modelling of Pollutant Concentrations

Dispersion modelling has been undertaken using Breeze Roads to determine air quality concentrations across the site. Breeze Roads is an air dispersion modelling software suite that predicts air quality impacts of carbon monoxide (CO), nitrogen dioxide, particulate matter (PM), and other inert pollutant concentrations from moving and idling motor vehicles at or alongside roadways and roadway intersections.

Breeze Roads can be used in conjunction with the MOBILE5, EMFAC emission models or other emissions data, to demonstrate compliance with the UK's National Air Quality Strategy. Breeze Roads predicts air pollutant concentrations near highways and arterial streets due to emissions from motor vehicles operating under free-flow conditions and idling vehicles. In addition, 1-hour and running 8-hour averages of CO or 24-hour and annual block averages of PM_{10} can be calculated.

4.3. Model Set-up Parameters

The most recent Emissions Factor Toolkit (EFT, version 10.1, August 2020) issued by DEFRA was used to derive emissions rates (in grams per kilometre) for vehicle movements along roads incorporated into the model for the models modelling the proposed development. This version of the EFT takes into consideration the following information available from the National Atmospheric Emissions Inventory (NAEI); the fleet composition data for motorways, urban and rural roads in the UK (excluding London), fleet composition based on European emission standards from pre-Euro I to Euro 6/VI (including Euro 6 subcategories), the scaling factors reflecting improvements in the quality of fuel and some degree of retrofitting and the technology conversions in the national fleet.

[16] DEFRA, 2018, Local Air quality Management Technical Guidance (TG16)

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Version 10.1 of the EFT was produced by DEFRA in response to changes in 'real world' vehicle emissions. As such, it has been assumed that the EFT produces reliable emission factors which are suitable for dispersion modelling as it is the most up-to-date tool provided by DEFRA. 2019 meteorological data from London City Airport has been used in the modelling and the wind rose is shown in **Appendix 3**.

4.4. Construction Phase

During the construction phase, there will be a number of activities undertaken that have the potential to generate and/or re-suspend dust and PM_{10}/$PM_{2.5}$. At the time of assessment, the exact activities to be undertaken during construction are unknown. In order to evaluate the magnitude and extent of potential adverse impacts likely to result from the Proposed Development, it has been assumed that the following construction activities could be responsible for the emission of dust:

- Handling, storing, stockpiling and disposing of materials, including potential spillages;
- Ground disturbance and exhaust emissions associated with the operation of site plant;
- Laying of hard surfaces and landscaping;
- Site clearance and preparation;
- Construction and fabrication processes; and
- Internal and external finishing.

The magnitude of the potential impacts of a construction site on air quality is mainly determined by its size, the range of activities undertaken across the Site, the proximity of the Site to sensitive receptors, the prevailing wind direction, the complexity of terrain and any barriers between the sources and receptors. A qualitative assessment of the potential impacts during construction has been undertaken using information in guidance documents produced by the Building Research Establishment[17] and the recent document produced by the Institute of Air Quality Management[18]. Following the release of the IAQM Guidance in 2016, the assessment criteria have been revised. The dust assessment criteria have now been broken down into five steps;

- Step 1: Screen the need for a detailed assessment;
- Step 2: Assess the risk of dust impacts;
    - Step 2A – Determine the scale and nature of the works;
    - Step 2B – Assess the sensitivity of the area;
    - Step 2C – Combine 2A and 2B to determine the risk of dust impacts;
- Step 3: Site Specific Mitigation;
- Step 4: Determine Significance of Effects;
- Step 5: Dust Assessment Report.

According to the IAQM Guidance (2016), activities on construction sites can be divided into four types to reflect their different potential impacts, with the potential for dust emissions to be assessed only for each activity taking place:

- Demolition;

[17] BRE, 2003. Control of Dust from Construction and Demolition Activities
[18] IAQM. 2016. Guidance on the Assessment of Dust from Demolition and Construction.

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- Earthworks;
- Construction; and
- Trackout.

The assessment methodology considers three separate dust effects:

- Annoyance due to soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM_{10}.

Account is also to be taken of the distance of the receptors from the Site that may experience these effects. Receptors are generally considered to be of a medium or high sensitivity to each type of construction activity when they are situated within 200m of the planning application boundary. Human receptors include locations where people spend time and where property may be affected by dust. In terms of annoyance effects, this will most commonly relate to the loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a statutory nuisance.

The assessment procedure assumes no mitigation measures are applied except those required by legislation.

4.5. Assessment Criteria

For the purposes of this assessment and the requirements, the limit values assigned to individual pollutants as set out in the Air Quality Standards Regulations 2010 form the basis of the air quality assessment. The limit values are based on an assessment of the effects of each pollutant on public health. Therefore, they are a good indicator in assessing whether, under normal circumstances, the air quality in the vicinity of a development is likely to be detrimental to human health.

4.6. Operational Phase

The main pollutants of concern are generally considered to be NO_2 and PM_{10} for road traffic. The Breeze Roads methodology has been used for this assessment to predict the constraints on the Site.

For the assessment, the following scenarios were considered:

- 2019 Model Verification;
- 2025 Opening Year with Development.

4.7. Traffic Data

The Breeze Roads prediction model requires the user to provide various input data, including the Annual Average Daily Traffic (AADT) flow, the number of heavy-duty vehicles (HDVs), the distance of the road centreline from the receptors and vehicle speeds. The traffic information is detailed in **Table 4.1** and **Table 4.2** below for the verification and assessment scenarios.

Table 4.1 identifies the traffic data for 2019 which was utilised for the verification. Traffic flow and vehicle split data were obtained from the London Atmospheric Emissions Inventory (2016)[19] . Vehicle

[19] https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2016

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speeds were based on speed estimations and were subsequently adjusted where it was deemed, they were not sufficiently accurate, e.g. at junctions, crossings, etc.

Table 4.1: 2019 Traffic Flow Data for Verification

Monitoring Site	Road Section	AADT	Speed (km/h)*	HDV%
CD9, CA4A, CA27	A501 – Euston Road – A400 to A4200	63,599	48	5.7
	A501 – Euston Road – A4200 to A5203	51,573	48	8.5
CA21 Bloomsbury Street	A400 Bloomsbury Street	14,259	32	10.5

Note: This is a non-exhaustive summary of the road sections modelled and includes the sections that are likely to contribute the greatest emissions to the development receptors.
*these are the speed limit of the roads and will be reduced approporiately at junctions, etc.

Table 4.2 identifies the estimated 2025 AADT traffic flows for roads near to the proposed development (for use in the constraints modelling).

In terms of parking numbers, across the whole Tybalds Estate, there are 133 spaces existing and 80 in the proposed scenario (this accounts for all changes associated with on-site parking including commercial, on-site Camden permit CPZ bays, Camden private estate parking bays, disabled bays, unrestricted bays and the ambulance bays), there is therefore a decrease in parking across the Estate of 53 spaces.

The data were then scaled to the earliest expected occupation year of the proposed development, 2025, using a final growth factor of 1.0499 obtained from TEMPro and English Regional Traffic Growth and Speed Forecasts (RTF). Vehicle speeds were based on speed estimations and were subsequently adjusted where it was deemed, they were not sufficiently accurate, e.g., at junctions, crossings, etc.

Table 4.2: 2025 Opening Year Traffic Flow Data

Model scenarios	Road Section	AADT	Speed (km/h)*	HDV (%)
Opening Year	Great Ormand Street	15,451	32	13.3
	Boswell Street	8,485	32	14.6
	Orde Hall Street	6,981	32	16.3
	Old Gloucester Street	3,502	32	9.6
	A40 - Bloomsbury Street to Shaftesbury Avenue	17,625	48	12.7
	A401 – Theobald's Road	21,316	48	10.2

Note: This is a non-exhaustive summary of the road sections modelled and includes the sections that are likely to contribute the greatest emissions to the development receptors.
*this is the speed limit of the road and will be reduced approporiately at junctions, etc.

4.8. Validation and Verification of the Model

Model validation undertaken by the software developer will not have been carried out in the vicinity of the site being considered in this assessment. As a result, it is necessary to perform a comparison

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of the modelled results with local monitoring data at suitable locations. This verification process aims to minimise model uncertainty and systematic error by correcting modelled results by an adjustment factor to gain greater confidence in the final results. The verification was carried out in accordance with LAQM.TG16. Suitable monitoring data for the purpose of verification is available for concentrations of NO_2 at the monitoring positions detailed in **Section 3.3**.

When the monitored and modelled results are compared as recommended in LAQM.TG16 the road NO_X adjustment factor is **2.5598** (as identified in **Table 4.3**). This factor was applied to all modelled NO_x results prior to calculating modelled NO_2 using the NO_x to NO_2 calculator. In the absence of appropriate PM_{10} monitoring within close proximity to the site, the NO_x adjustment factor has also been applied to the PM_{10} modelled concentrations, in accordance with the guidance provided in LAQM.TG16.

Table 4.3: NO_2 Annual Mean Verification for 2019

Monitoring Position	Monitored		Modelled		% Difference (NO_x Roads) Before Adjustment	% Difference (NO_2 Total) After Adjustment	Road NO_X Factor
	Road NO_2 µg/m³	Road NO_X[20] µg/m³	Road NO_2 µg/m³	Road NO_X µg/m³			
CD9	30.44	83.50	11.88	28.85	-65.45	-4.30	**2.5598**
CA4A	29.80	81.28	11.76	28.47	-64.98	-3.82	
CA27	24.25	63.97	12.82	31.31	-51.06	8.07	
CA21	7.33	17.44	3.20	7.42	-57.48	1.28	

Typically, with smaller datasets, the root mean square error (RMSE) is the important statistic and the verification process resulted in an RMSE below the target value of <4µg/m³, where the concentration may be near the AQO, as identified in **Table 4.4**. Therefore, there is a high level of confidence in the verification process.

Table 4.4: Summary of the Statistics Used to Assess Model Uncertainty

Statistical Parameter	Value	Description
Correlation Coefficient	0.925	Used to measure the linear relationship between predicted and observed data. The ideal value (an absolute relationship) is 1.
Root Mean Square Error (RMSE)	3.28	RMSE defines the average error/uncertainty of the model verification and is in the same units as the model outputs (µg/m³). Values should be <10µg/m³ or ideally <4µg/m³ where concentrations are near the AQO. The ideal value is 0µg/m³.
Fractional Bias	0.89	Identifies if the model shows a systematic tendency to over/under predict concentrations. The ideal value is 0 and range between +/- 2. Negative values suggest an over prediction whilst positive values suggest under prediction.

[20] Obtained from NO_X to NO_2 Calculator Spreadsheet available from www.laqm.Defra.gov.uk

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4.9. Assessment of $PM_{2.5}$

The 2007 Air Quality Strategy introduced a new exposure reduction regime for $PM_{2.5}$, tiny particles associated with respiratory and cardio-vascular illness and mortality which have no known safe limit for human exposure. The new regime will attempt to reduce the exposure of all urban dwellers, alongside the existing method of reducing hotspots of PM exposure. $PM_{2.5}$ typically makes up two-thirds of PM_{10} emissions and concentrations. However, objectives for $PM_{2.5}$ (as shown in **Table 4.5**) are not currently incorporated into Local Air Quality Management regulations, therefore there is no statutory obligation to review and assess air quality against them.

Table 4.5: National Exposure Reduction Target, Target Value and Limit Value for $PM_{2.5}$

Time Period	Objective/Obligation	To be achieved by
Annual Mean	Target value of 25µg/m^3	2010
Annual Mean	Limit value of 25µg/m^3	2015
Annual Mean	Stage 2 indicative limit value of 20µg/m^3	2020
3-year Average Exposure Indicator (AEI)[a]	Exposure reduction target relative to the AEI depending on the 2010 value of the 3-year AEI (ranging from a 0% to a 20% reduction)	2020
3-year Average Exposure Indicator (AEI)[a]	Exposure concentration obligation of 20µg/m^3 (of vegetation)	2015

[a] The 3-year running mean of AEI is calculated from the $PM_{2.5}$ concentration averaged across all urban background monitoring locations in the UK e.g. the AEI for 2010 is the mean concentration measured over 2008, 2009 and 2010.

Presently, Breeze Roads does not predict the concentration of $PM_{2.5}$ as part of the methodology, therefore, the future concentration of $PM_{2.5}$ will be calculated using the typical ratio between the background concentrations of PM_{10} and $PM_{2.5}$ for the opening year of development. This predicted concentration will then be compared against the annual mean Objective Limit value of 25µg/m^3.

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5. IMPACTS AND CONSTRAINTS OF AIR QUALITY

5.1. Predicted Construction Impacts

The main sources of dust and particulate matter during the construction phase include:

- Haulage routes, vehicles and construction traffic;
- Materials handling, storage, stockpiling, potential spillage and disposal;
- Exhaust emissions from site plant;
- Site preparation;
- Construction and fabrication processes; and
- Internal and external finishing and refurbishment.

The majority of the releases are likely to occur during the typical 'working-week'. However, for some potential sources, for example exposed soil produced from earthworks activities, in the absence of dust control mitigation measures, dust generation has the potential to occur 24-hours per day, over the period during which such activities take place.

Depending on wind speed and turbulence it is likely that the majority of dust will be deposited in the area immediately surrounding the source (up to 200 metres away). The Windrose in **Appendix 3** shows that the dominant wind direction for the site is from the south-west. Therefore, properties within 200m to the north-east of the site are more at risk of experiencing the effects of construction dust. The risk of effects are summarised in **Table 5.1** below.

Table 5.1: Summary of Risk Effects with No Mitigation

Source	Dust Soiling Effects	Ecological Effects	PM_{10} Effects
Demolition	Low Risk	N/A	Low Risk
Earthworks	Medium Risk	N/A	Low Risk
Construction	Medium Risk	N/A	Low Risk
Trackout	Medium Risk	N/A	Low Risk

In consideration of the factors described above, the overall effects of dust nuisance would therefore be temporary, short term, local in effect and of low to medium risk without mitigation. However, with the dust mitigation in **Section 6** implemented during the construction phase, the impacts should be low to negligible.

5.2. Operational Impact Assessment

The proposed development will provide three new blocks of flats (Blocks B, C and D) comprising 36 new units. Two blocks of mews are proposed (eastern mews and western mews) which will comprise 10 houses. Beneath three of the existing blocks (Blemundsbury, Falcon and Richbell) an additional 10 units are proposed within the existing basement areas (underbuild). Beneath part of Falcon and at the ground floor of Block C, community facilities are proposed comprising three halls and associated facilities.

As the proposed development is reusing some existing basement areas, and there will be a reduction in parking provision of 53 parking spaces, there is unlikely to be significant increases in the number of vehicles trips on the local road network. Therefore, the proposed development will not have a significant impact on local traffic pollutant concentrations.

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5.3. Predicted Air Quality Constraints on the Development

As identified in **Table 2.2**, the AQS objectives apply at locations where members of the public are likely to be regularly present and exposed over the averaging period of the objectives. On the basis that the proposed development consists of residential dwellings on all floors the annual mean objective is to be assessed to determine whether mitigation measures are required to mitigate against poor air quality.

5.3.1. Sensitive Receptors Identification

In order to characterise the air quality at the proposed development, predictions of air pollutant concentrations have been carried out for the earliest potential occupation year of 2025 using the Breeze Roads dispersion model and UK emission factors.

Development receptors were modelled at a height of 0m for the underbuilds and 1.5m for the ground floor receptors of the proposed development as identified in **Appendix 4**.

Higher floors were not modelled as the general trend for pollutant concentrations is to reduce with increasing height, therefore it was only deemed necessary to model pollutant concentrations at the underbuild and ground floor, which is a worst-case scenario. The results of the predictions which include the road NO_X adjustment factor (**Table 4.3**) can be identified in **Tables 5.2** and **5.3**.

5.3.2. Air Quality Constraints – 2025 Annual Mean NO_2 Concentrations

Table 5.2 identifies the modelled NO_2 concentrations at development receptors in 2025. At the development site, the annual mean predicted concentrations is range from 36.6µg/m^3 to 38.1µg/m^3, which are below the AQO.

Table 5.2: Modelled 2025 NO_2 Concentrations – Development Receptors

Receptor	Height	Air Quality Objective (µg/m^3)	NO_2 Road Contribution (µg/m^3)	Total NO_2 (µg/m^3)
DR1	1.5	40	0.7	36.6
DR2	1.5		0.7	36.7
DR3	1.5		0.7	36.6
DR4	1.5	40	0.7	36.7
DR5	1.5		0.7	36.6
DR6	1.5		0.7	36.7
DR7	1.5		1.0	36.9
DR8	1.5	40	1.0	37.0
DR9	1.5		0.6	36.6
DR10	1.5		0.6	36.6
DR11	1.5		0.7	36.6
DR12	1.5	40	0.7	36.6
DR13	0		1.3	37.3

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Receptor	Height	Air Quality Objective (µg/m³)	NO_2 Road Contribution (µg/m³)	Total NO_2 (µg/m³)
DR14	0		1.0	37.0
DR15	0		1.8	37.7
DR16	0		1.4	37.4
DR17	1.5		2.1	38.1
DR18	0		0.9	36.9
DR19	0		1.0	36.9
DR20	0		1.5	37.5
DR21	0		1.4	37.3
DR22	1.5		0.7	36.7
DR23	1.5		0.7	36.7
DR24	1.5		1.3	37.3
DR25	1.5		1.3	37.2

5.3.3. Air Quality Constraints – 2025 Annual Mean Particulate Matter Concentrations

Table 5.3 identifies the modelled PM_{10} and $PM_{2.5}$ concentrations in 2025. Highest modelled PM_{10} concentrations are predicted to be 18.7µg/m³. Highest modelled $PM_{2.5}$ concentrations are predicted to be 12.1µg/m³, which are both significantly below the AQO's.

Table 5.3: Modelled 2025 PM_{10} and $PM_{2.5}$ Concentrations – Development Receptors

Receptor	Height	PM_{10} Air Quality Objective (µg/m³)	Total PM_{10} µg/m³ (Days >50 µg/m³) [20]	$PM_{2.5}$ Air Quality Objective (µg/m³)	Total $PM_{2.5}$ µg/m³
DR1	1.5	40	18.5 (2)	25	11.9
DR2	1.5		18.5 (2)		11.9
DR3	1.5		18.5 (2)		11.9
DR4	1.5		18.5 (2)		11.9
DR5	1.5	40	18.5 (2)	25	11.9
DR6	1.5		18.5 (2)		11.9
DR7	1.5		18.6 (2)		12.0
DR8	1.5		18.6 (2)		12.0
DR9	1.5	40	18.4 (2)	25	11.9
DR10	1.5		18.4 (2)		11.9
DR11	1.5		18.4 (2)		11.9
DR12	1.5		18.4 (2)		11.9

DR13	0	40	18.6 (2)	25	12.0
DR14	0		18.5 (2)		11.9
DR15	0		18.7 (2)		12.0
DR16	0		18.6 (2)		12.0
DR17	1.5		18.7 (2)		12.1
DR18	0	40	18.5 (2)	25	11.9
DR19	0		18.5 (2)		11.9
DR20	0		18.6 (2)		12.0
DR21	0		18.6 (2)		12.0
DR22	1.5	40	18.5 (2)	25	11.9
DR23	1.5		18.5 (2)		11.9
DR24	1.5		18.7 (2)		12.0
DR25	1.5		18.7 (2)		12.0

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6. MITIGATION

6.1. Construction Phase

If Best Practice mitigation techniques are implemented, it is considered that the potentially significant impact from the construction phase would be negligible to low.

There are a number of Best Practice mitigation measures that can be used, which include:

6.1.1. Site Planning

- Limit the area(s) of working during construction so that vehicles are confined within an area that can be subjected to appropriate dust control;
- Erect solid barriers around the site boundary;
- Dust generating activities to be located away from sensitive receptors (where possible);
- Fully enclose site or specific operations where there is a high potential for dust generating activities;
- All site personnel will be fully trained;
- There will be a trained and responsible manager on site during working times to maintain a dust event logbook and carry out site inspections;
- There will be no runoff of mud or water from the Site;
- Stockpiles will be located as far as possible from sensitive properties and ecological receptors, taking account of the prevailing wind direction;
- Hard surface site haul roads will be maintained to minimise mud and dust build up;
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the LA, if requested; and
- Record any exceptional incidents that cause dust and/or air emissions, both on- or off-site and the action taken to resolve the situation in the logbook.

6.1.2. General Site Activities

- Undertake visual checks for windblown dust;
- Observation of wind speed and direction will be undertaken prior to conducting dust-generating activities to determine the potential for dust nuisance to occur. Potentially dust-generating activities will be avoided when the wind direction may carry dust into sensitive areas and dust-generating operations will be avoided during periods of high or gusty winds or by erecting barriers adjacent to sensitive receptors;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- Use of appropriately designed vehicles for material handling;
- Minimise dust generating activities where possible;
- Use water as a dust suppressant where applicable;
- Stockpiles will be covered, enclosed, seeded or kept sheeted;
- Smoke emissions or fumes from site plant or stored fuel will be limited;

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- On-site aggregate handling will be carried out in enclosed areas and transfer will be completed in a way that minimises the requirements to deposit materials from height; and
- If applicable, any concrete crushers/batchers will have the required permits.

6.1.3. Operations

- Only use cutting / grinding / sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

6.1.4. Demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground; and
- Bag and remove any biological debris or damp down such material before demolition.

6.1.5. Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

6.1.6. Construction

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

6.1.7. Construction Traffic

- All vehicles to switch off engines (no idling);
- On road vehicles will comply to set emission standards;
- Vehicles should be kept clean through the use of wheel washers as appropriate, particularly on departure from the development area onto the public highway;
- Vehicles carrying loose aggregate, fill materials or contaminated materials to and from the development area should be sheeted at all times;
- When loading materials into vehicles or using transfer chutes and skips, drop heights will be kept to a minimum and enclosed wherever possible;
- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable;
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site logbook;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10m from receptors where possible.

6.2. Operation Phase

As identified by the constraints assessment, there will be no exceedances of the NAQO's for NO_2, PM_{10} and $PM_{2.5}$ at any of the proposed development receptors for the projected earliest potential occupation year of 2025. The highest modelled NO_2 and PM_{10} concentrations at sensitive development receptors are 38.1µg/m^3 and 18.7µg/m^3 respectively, which are significantly below the annual mean NO_2 and PM_{10} objective values of 40µg/m^3.

As there is a decrease in parking of 53 spaces on the site, any increase in traffic is unlikely to result in a significant impact, therefore an impact assessment has not been undertaken.

Email: enquiry@accon-uk.com ● www.accon-uk.com ● 0118 971 0000
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH

7. CONCLUSIONS

During the operational phase when the development is occupied, the Breeze Roads modelling predicts that there will be no exceedances of the nitrogen dioxide or particulate matter objectives at the sensitive development receptors on the site. Accordingly, mitigation is not required.

Additionally, the development is not anticipated to result in anything other than a very small increase in traffic movements, and as such there will be no measurable increases in pollutant concentration levels at existing sensitive receptors within the AQMA.

Email: enquiry@accon-uk.com ● www.accon-uk.com ● 0118 971 0000
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH

APPENDICES

Email: enquiry@accon-uk.com ● www.accon-uk.com ● 0118 971 0000
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH

Appendix 1: Glossary of Terms

AADT	Annual Average Daily Traffic
AAHT	Annual Average Hourly Traffic
AQMA	Air Quality Management Area -An area that a local authority has designated for action, based upon predicted exceedances of Air Quality Objectives.
AQS/ NAQOs	Air Quality Standard/ National Air Quality Objectives - The concentrations of pollutants in the atmosphere, which can broadly be taken to achieve a certain level of environmental quality. The standards are based on assessment of the effects of each pollutant on human health including the effects on sensitive sub groups.
AURN	Automatic Urban and Rural Network Air Quality Monitoring Site.
Calendar Year	The average of the concentrations measured for each pollutant for one year. In the case of the AQS this is for a calendar year.
Concentration	The amount of a (polluting) substance in a volume (of air), typically expressed as a mass of pollutant per unit volume of air (for example, micrograms per cubic metre, $\mu g/m^3$) or a volume of gaseous pollutant per unit volume of air (parts per million, ppm).
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EFT	Emissions Factor Toolkit
Exceedance	A period of time where the concentration of a pollutant is greater than the appropriate Air Quality Objective.
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
LAQM	Local Air Quality Management
Nitrogen Oxides	Nitric oxide (NO) is mainly derived from road transport emissions and other combustion processes such as the electricity supply industry. NO is not considered to be harmful to health. However, once released to the atmosphere, NO is usually very rapidly oxidised to nitrogen dioxide (NO_2), which is harmful to health. NO_2 and NO are both oxides of nitrogen and together are referred to as nitrogen oxides (NO_x).
PM_{10}/$PM_{2.5}$	Fine Particles are composed of a wide range of materials arising from a variety of sources including combustion sources (mainly road traffic), and coarse particles, suspended soils and dust from construction work. Particles are measured in a number of different size fractions according to their mean aerodynamic diameter. Most monitoring is currently focused on PM_{10} (less than 10 microns in aero-dynamic diameter), but the finer fractions such as $PM_{2.5}$ (less than 2.5 microns in aero-dynamic diameter) is becoming of increasing interest in terms of health effects.
TEMPro	TEMPro is software produced by the DfT to calculate the expected growth of traffic by year on roads throughout the country. The factor varies depending on the region and type of road.
$\mu g/m^3$	Micrograms per cubic metre of air - A measure of concentration in terms of mass per unit volume. A concentration of $1\mu g/m^3$ means that one cubic metre of air contains one microgram (millionth of a gram) of pollution.

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Appendix 2: Air Quality Standards

Pollutant	Averaging Period	Limit Value	Margin of Tolerance
Benzene	Calendar Year	5µg/m^3	
Carbon Monoxide	Maximum daily running 8 Hour Mean	10mg/m^3	
Lead	Calendar Year	0.5µg/m^3	100%
Nitrogen Dioxide	One Hour	200µg/m^3 Not to be exceeded more than 18 times per year	
	Calendar Year	40µg/m^3	
Particulates (PM_{10})	One day	50µg/m^3 Not to be exceeded more than 35 times per year	50%
	Calendar Year	40µg/m^3	20%
Particulates ($PM_{2.5}$)	Calendar Year	25µg/m^3	20%
Sulphur Dioxide	One Hour	350µg/m^3 Not to be exceeded more than 24 times per calendar year	150µg/m^3
	One Day	150µg/m^3 Not to be exceeded more than 3 times per calendar year	

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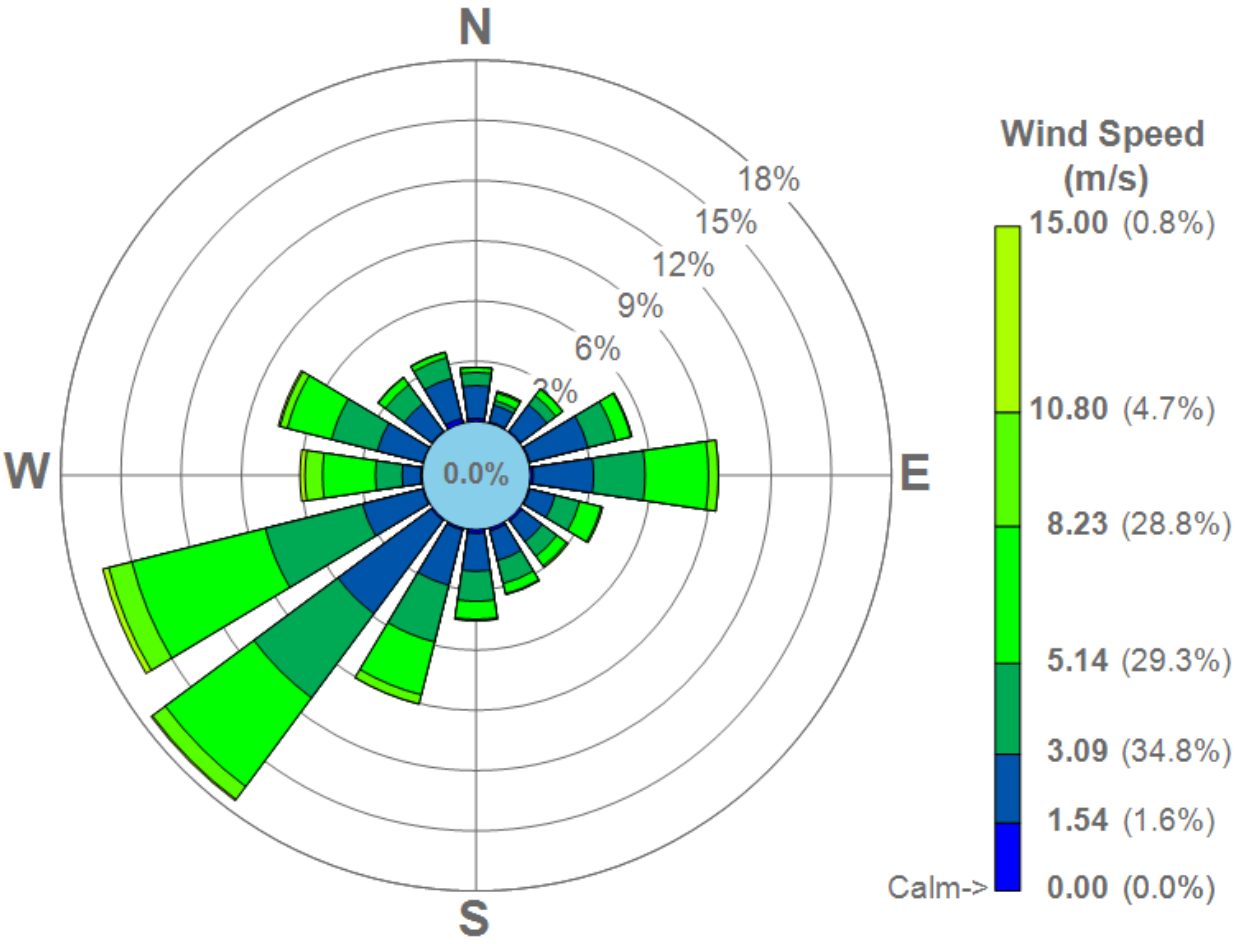
Appendix 3: 2019 London City Airport Wind Rose



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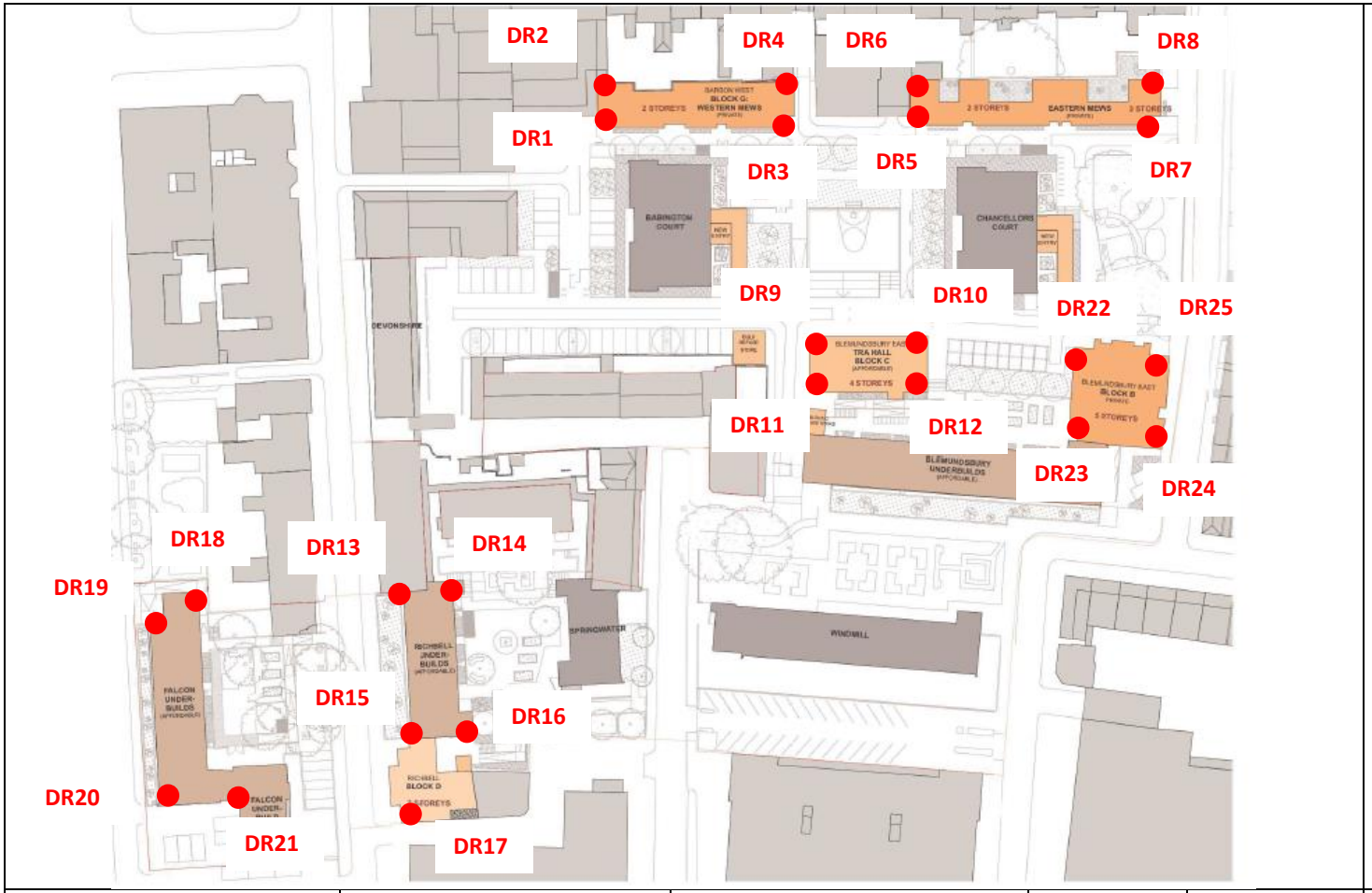
Appendix 4: Proposed Development Receptor Locations



Client: London Borough of Camden		Description: Proposed Development Receptor Locations		Design:	CP
				Drawn:	CP
Rev: A	Description: FINAL	Project: Tybalds Estate, Camden		Checked:	GP
				Approved:	GP
				Appendix 4	
				Scale: Not to Scale	

Email: enquiry@accon-uk.com ● www.accon-uk.com ● 0118 971 0000
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH

Email: enquiry@accon-uk.com

Reading Office:
Unit B, Fronds Park,
Frouds Lane, Aldermaston,
Reading, RG7 4LH
Tel: 0118 971 0000 Fax: 0118 971 2272

Brighton Office:
Citibase, 95 Ditchling Road,
Brighton, East Sussex, BN1 4ST
Tel: 01273 573 814

www.accon-uk.com

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