Report

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TEMPLE

LEADERS IN ENVIRONMENT, PLANNING & SUSTAINABILITY.

Report for – Llewelyn Davies

T3020 – Arthur Stanley House
Air Quality Assessment
Final

Document Version Control

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1.0 Introduction

University College London Hospitals Charity (UCLHC) is applying for planning permission to develop Arthur Stanley House. The site is located on the corner of Tottenham Street and Tottenham Mews, approximately 20m from Cleveland Street to the north, 80m from Charlotte Street to the south and directly opposite Goodge Place.

UCLHC is seeking an approval to change the use of the site from a healthcare facility to office space and residential; the development proposal is for 14 residential units and 4,871m^2 of office space. The location of the site is shown in the location plan in **Appendix 1**.

UCLHC has commissioned Temple Group Limited (Temple) to carry out an air quality assessment to accompany the planning application.

Temple has undertaken a baseline assessment in order to evaluate air quality conditions at the site and address the suitability of the site with regard to the potential constraints that local air quality may have on its occupants. This assessment has also included an air quality neutral assessment in line with the Greater London Authority (GLA) Supplementary Planning Guidance (SPG) 2014. Temple has also carried out a risk-based qualitative assessment of potential impacts that could arise during construction works of the development.

2.0 Relevant Legislation and Policy

2.1 Air Quality Strategy 2007

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland[1] (AQS) sets the framework for government policy on air quality in the UK. The AQS sets out air quality standards and objectives to be achieved and introduces a policy framework for tackling fine particles. In setting air quality objectives, due account was taken of health and socio-economic cost-benefit factors, together with consideration of the practicalities of achieving such targets. Air quality objective levels are set out in legislation in the Air Quality (England) Regulations 2000[2], as amended[3].

Although achievement of air quality objectives is not a statutory requirement for local authorities, the objectives reflect statutory limits outlined in The Air Quality Standards Regulations 2010[4], which require the Secretary of State to achieve EU limit values set out in EU Ambient Air Quality Directives[5] [6].

The air quality objectives outlined in the AQS relevant to this assessment have been provided below in **Table 2.1.**

Table 2.1 - Relevant UK Air Quality Objectives for the Purpose of this Assessment

Pollutant	Air Quality Objective Levels	Measured as	Dates to be Achieved and Maintained Thereafter
Nitrogen Dioxide	200 µg/m^3 Not to be exceeded more than 18 times per year	1-hour mean	31 December 2005
	40 µg/m^3	Annual mean	31 December 2005
Particles (PM_{10})	50 µg/m^3 Not to be exceeded more than 35 times per year	24-hour mean	31 December 2004
	40 µg/m^3	Annual mean	31 December 2004

[1] Department of the Environment, Food and Rural Affairs, et al, 2007, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Volume 1 s.l, s.n.

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

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

[4] The Air Quality Standards Regulations 2010, (2010 No. 1001). London:HMSO.

[5] The European Parliament and the Council of the European Union, 2008, Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air and cleaner air for Europe. Official Journal of the European Union L152/2 11.6.2008.

[6] The European Parliament and the Council of the European Union , 2004, Directive 2004/107/EC of the European Parliament and of the Council of 15 May 2005 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. (Fourth Daughter Directive). Official Journal of the European Union L23/3 26.1.2005.

2.2 The Environment Act 1995

Under Part IV of the Environment Act 1995[7], local authorities in the UK carry out regular reviews and assessments of air quality in their areas. This review and assessment process now follows a risk-based, phased approach, whereby local authorities undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded. Local authorities must designate any areas where air quality objectives are exceeded (or are likely to be exceeded) as air quality management areas (AQMAs). Local authorities must then produce an air quality action plan or plans describing measures in pursuit of air quality objectives in AQMAs.

2.3 National Planning Policy Framework

The National Planning Policy Framework was published on the 27th March 2012 and has replaced all Planning Policy Guidance and Planning Policy Statements, including PPS23: Planning and Pollution Control.

It sets out the Government's Planning Policies for England and how these are expected to be applied. It seeks to positively improve the quality of the built, natural and historic environment, as well as in people's quality of life, including improving the conditions in which people live, work, travel and take leisure.

On air quality, paragraph 124 of the NPPF states:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

2.4 The London Plan and the Mayor's Air Quality Strategy

The London Plan[8] (LP) defines the spatial development strategy for strategic planning in Greater London. The LP deals with issues that are of strategic importance to Greater London. The LP provides a broad overarching policy for authorities in Greater London and provides the basis and direction for local policies. Policy 7.14 relates to improving air quality:

"Strategic

"A) The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution."

"Planning decisions

[7] Environment Act 1995, Part IV Air Quality

[8] Greater London Authority, 2011, The London Plan: Spatial Development Strategy for Greater London, Greater London Authority, London.

"B) Development proposals should:

"minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)

"promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the supplementary planning guidance in the GLA and London Councils' 'The control of dust and emissions during construction and demolition'[9]

"be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs)

"ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches

"where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified.

"LDF preparation

"Boroughs should have policies that:

"A) seek reductions in levels of pollutants referred to in the Government's National Air Quality Strategy having regard to the Mayor's Air Quality Strategy

"B) take account of the findings of their Air Quality Review and Assessments and Action Plans, in particular where Air Quality Management Areas have been designated."

The Mayor's Air Quality Strategy[10] seeks to meet the requirements of the 2010 Regulations. Under the Greater London Authority Act 1999[11], the Mayor must include in his Air Quality Strategy policies and proposals for the implementation in Greater London of the policies in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland[1], and for the achievement in Greater London of air quality standards and objectives in the Air Quality (England) Regulations 2000[2]. The Mayor's Air Quality Strategy also includes, among other things, other policies and proposals that the Mayor considers appropriate, as well as information on London's current and likely future air quality.

[9] Greater London Authority, 2014, Supplementary Planning Guidance: The Control of Dust Emissions from Construction and Demolition, London: Greater London Authority.

[10] Greater London Authority, 2010, *Clearing the Air, The Mayor's Air Quality Strategy*, Greater London Authority, London

[11] Greater London Authority Act 1999 (1999 c.29)

2.5 Supplementary Planning Guidance: Sustainable Design and Construction

The LP and the Mayor's Air Quality Strategy aim to reduce air pollutant emissions and in addition to this, the Supplementary Planning Guidance on Sustainable Design and Construction[12] provides some principles that can be incorporated into the design and construction of buildings. These include:

- **Essential Standards:**
  - All new gas boilers should produce low levels of NOx; and
  - Take measures to reduce and mitigate exposure to air pollution.

- **Preferred Standards**:
  - Low emission developments that are designed to minimise the air quality impact of the plant, vehicles and other sources over the lifetime of the development.

2.6 Local Policy

2.6.1 Camden Local Development Framework

Camden's Local Development Framework was adopted in November 2010[13]. It replaces the Camden Unitary Development Plan (UDP). Policies included in the plan relating to air quality include Policy DP32, which states that:

"The Council will require air quality assessments where development could potentially cause significant harm to air quality. Mitigation measures will be expected in developments that are located in areas of poor air quality".

Camden Council's Amenity SPD[14] sets out when an air quality assessment is required and the elements required to be set out within an air quality assessment.

2.6.2 London Borough of Camden Air Quality Action Plan

Following the designation of the whole of Camden as an air quality management area (AQMA), the Council published an air quality action plan (AQAP)[15] in 2002 to promote better air quality conditions within the Borough. The AQAP details initiatives that Camden Council will deliver to improve air quality.

[12] Greater London Authority, 2014, Sustainable Design and Construction, The London Plan Supplementary Planning Guidance, Greater London Authority, London.

[13] Camden Council. 2010. Camden Development Policies (adoption version). Camden Local Development Framework

[14] Camden Council. 2010. Camden Planning Guidance: CPG6 Amenity. http://www.camden.gov.uk/ccm/content/environment/planning-and-built-environment/two/planning-policy/supplementary-planning-documents/camden-planning-guidance.en

[15] Camden Council. 2002. Air Quality Action Plan.

The main action plan initiatives identified by Camden Council include the following:

- *"Encourage reductions in fossil fuel use, the adoption of clean fuels and technology and promote energy efficiency.*
- *Raise awareness about air quality in Camden and promote lifestyle changes which can help reduce levels of air pollution and exposure to air pollution.*
- *Improve the health and well-being of the local population.*
- *Work in partnership with national and regional bodies, and with local public and private organisations, to foster improvements in air quality.*
- *Lead by example and reduce NO_2 and PM_{10} emissions associated with the Council's own buildings and transport services.*
- *Ensure actions which serve to reduce NO_2 and PM_{10} emissions complement actions to mitigate CO_2 emissions, and vice-versa."*

3.0 Methodology

3.1 Air Quality Assessment Methodology for Roads

Road traffic can be considered a primary source of emissions to air. The combustion of fuel in vehicles leads to a number of harmful by-products which can affect air quality in the vicinity of roads. Areas with high traffic volumes or near to major roads often experience elevated pollutant levels, particularly in the form of nitrogen dioxide (NO_2) and particulates (PM_{10}).

The Highways Agency has developed a procedure for assessing the significance of traffic volumes on local air quality in its Design Manual for Roads and Bridges (DMRB)[16]. The procedure is designed to assess potential impacts resulting from changes in road use, including realignment, expansion and increased traffic flow. An assessment of impacts from the proposed development has been carried out in accordance with the following methodology.

The DMRB methodology adopts four assessment levels, each requiring a more detailed and in depth approach. If a source or the potential change in traffic volumes can be deemed to be insignificant at any level, no further assessment is required. The initial scoping stage includes a mixture of qualitative and quantitative techniques to gather data and evaluate potential emissions and impacts on local air quality. The scoping stage includes:

- The identification of key locations (sensitive receptors) that might experience a change in air quality as a result of the proposed changes or development;
- The examination/determination of air existing and future air quality conditions near the road or development, to assess the existing impacts and background levels of pollutants. This includes determination of any local AQMAs in the region; and
- The determination of existing traffic conditions and projected traffic conditions for the year the change or development is scheduled for completion. Information required includes, traffic volumes in terms of annual average daily traffic (AADT) flows, traffic composition and average vehicle speeds.

This information is assessed to ascertain significant changes and potential impacts based on set criteria defined in the DMRB methodology. These include:

- A change in road alignment of five metres or more;
- Daily traffic flows changing by 1,000 AADT or more, or heavy goods vehicle (HGV) flows changing by 200 AADT or more; and
- A daily average speed change of 10km/h or more, or a peak-hour speed change by 20km/h or more.

Should the affected roads fall below these criteria, or if there are no sensitive receptors within 200 metres of the road, the impacts on air quality can be considered to be 'neutral' or insignificant, and no further assessment is required.

In the case of this air quality assessment, for commercial and residential units at 40-50 Tottenham Street, there will be no significant traffic generation associated with the development. Traffic

[16] The Highways Agency, 2007, Design Manual for Roads and Bridges, Volume 11, Environmental Assessment: Section 3 Environmental Assessment Techniques

generation has not been quantified, but will be well below the DMRB criteria for assessment outlined above.

3.2 Construction Dust Assessment Methodology

Potential air emissions from demolition and construction activities, particularly in the form of dust, are an issue in the UK. This is further emphasised in large conurbations such as London, where existing air quality pollution is already high.

Key sources of air pollution from construction sites include:

- Dust created by demolition and crushing activities;
- Earth-moving and remediation activities;
- General construction activities, which may include, concrete mixing, cutting, grinding etc. and;
- Dust and exhaust emissions from haulage vehicles on site and on local roads.

Given the variability of construction sites and the range of activities undertaken, making an accurate assessment of the dust and air pollutants generated is not always feasible or practicable. Instead, a more qualitative assessment is undertaken to examine potential areas of concern and identify the best practicable means (BPM) for eliminating, minimising and mitigating potential emissions.

The GLA Supplementary Planning document[9] for controlling dust and emissions from construction and demolition sites provides useful information on managing and mitigating construction dust emissions. This document has been used as the basis for assessing potential impacts from the proposed development.

This assessment identifies potential works that may generate dust and incorporates a list of appropriate mitigation measures to control them.

3.3 Air Quality Neutral Assessment

Comparison with the standards in the Sustainable Design and Construction SPG[12] was made in order to determine whether the proposed development was within the benchmarks required to avoid any increase in emissions across London as a whole, and therefore to be considered air quality neutral. The building emission benchmarks and transport emission benchmarks for the appropriate land-use classes were applied.

In addition, the emissions standards set out in the Sustainable Design and Construction SPG were considered, in order to determine whether the boilers within the proposed development would meet the NO_X emission standard of <40mg NO_X/kWh.

4.0 Baseline Conditions

4.1 London Borough of Camden Review and Assessment Process

Camden Council completed its first statutory review and assessment of air quality in 2001. This assessment concluded that the national air quality objectives for carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide were not at risk of being exceeded. It was found that the national air quality objectives for annual mean NO_2, and annual and 24-hour mean PM_{10} would not be met within Camden by the relevant deadlines.

In 2001, an air quality management area (AQMA) was declared for the entire borough and an air quality action plan was finalised and published in October 2002. The plan outlines measures for improving air quality within the borough in collaboration with various internal and external stakeholders.

The fourth round of updating and screening assessments, undertaken by Camden Council in 2009, identified that the borough no longer exceeded the air quality objectives for PM_{10}, but continued to exceed the annual mean objective for NO_2. Subsequent review and assessment and progress reports have confirmed these findings. The reports also confirmed that the air quality management area should remain in place throughout the borough.

4.2 Local Monitoring

Camden Council undertakes monitoring at a number of locations within the borough using continuous automatic monitors and diffusion tubes. The nearest continuous monitoring locations to the site are described below:

- A continuous monitor at Bloomsbury, approximately 0.8km east of the site, monitoring NO_2, PM_{10}, $PM_{2.5}$, CO, SO_2 and O_3 and which is an urban background site;
- A continuous monitor at Shaftesbury Avenue, approximately 0.9km south-east of the site monitoring NO_2 and PM_{10} and which is a roadside site;
- A continuous monitor at Euston Road, approximately 1.0km north-east of the site monitoring NO_2 and which is a roadside site;
- A continuous monitor at Marylebone Road, approximately 1.2km west of the site, monitoring NO_2, PM_{10}, $PM_{2.5}$, CO_2, CO, SO_2 and O_3 and which is a roadside site; and
- A continuous monitor at Marylebone Road, approximately 1.2km west of the site, monitoring PM_{10} and $PM_{2.5}$ and which is a roadside site.

The Council also monitors NO_2 concentrations using diffusion tubes. The diffusion tubes are exposed at locations across the borough at roadside and background monitoring locations.

Table 4.1 to **Table 4.5** presents recent NO_2 and PM_{10} data for the nearest continuous monitoring sites and diffusion tube monitoring locations in recent years. The location of the nearest air quality monitoring site is shown in **Appendix 1**.

Table 4.1 shows monitoring results from the Bloomsbury urban background automatic monitoring site, located away from major air pollution sources and broadly representative of town/city-wide background concentrations.

The annual mean objective for PM_{10} has been met at this monitoring location in recent years; however, the NO_2 annual mean objective has been exceeded continually over the same period.

Table 4.1 - Annual Mean Concentrations at Bloomsbury monitoring location (µg/m^3)

Year	Concentration PM_{10}	Number of 24-hour exceedences	Concentration NO_2	Number of 1-hour exceedences
2009	22.7	15	54.2	2
2010	17.9	2	55.2	1
2011	22.5	17	49.9	0
2012	18.7	10	55.1	1
2013	18.0	4	51.0	0
Objective	**40**	**35**	**40**	**18**

Table 4.2 shows monitoring results from the Shaftesbury Avenue roadside automatic monitoring site. The PM_{10} annual mean objective has been met at this monitoring location in recent years. However, the NO_2 annual mean objective has been exceeded continually basis over the same period. In addition, the NO_2 hourly mean objective was exceeded at this location in 2010.

Table 4.2- Annual Mean Concentrations at Shaftesbury Avenue monitoring location (µg/m^3)

Year	Concentration PM_{10}	No of 24-hour exceedences PM_{10}	Concentration NO_2	No of 1-hour exceedences NO_2
2009	30.4	30	87.8	13
2010	29.5	29	88.7	21
2011	31.4	27	75.5	15
2012	28.8	18	71.2	12
2013	29.0	-	74.0	6
Objective	**40**	**35**	**40**	**18**

Table 4.3 shows monitoring results from the Euston Road roadside automatic monitoring site. Both the NO_2 annual mean and NO_2 one-hour mean objective were exceeded at this monitoring location in recent years. This monitoring site was opened in 2011.

This monitoring station is located on the A501 and is likely to be exposed to significant traffic emissions compared to conditions one would expect in the vicinity of the proposed development.

Table 4.3- Annual Mean Concentrations at Euston Road monitoring location (µg/m^3)

Year	Concentration NO_2	Number of 1-hour exceedences NO_2
2011	122.9	726
2012	106.1	295
2013	106.0	296
Objective	**40**	**18**

Table 4.4 shows monitoring results from the Marylebone Road roadside automatic monitoring site. The NO_2 and PM_{10} annual mean objectives have been exceeded on a continual basis at this monitoring location in recent years. The hourly mean objective for NO_2 was exceeded over the same period.

This monitoring station is located close on the A501 and is likely to be exposed to significant traffic emissions compared to conditions one would expect in the vicinity of the proposed development.

Table 4.4- Annual Mean Concentrations at Marylebone Road monitoring location (µg/m^3)

Year	Concentration PM_{10}	No of 24-hour exceedences PM_{10}	Concentration NO_2	No of 1-hour exceedences NO_2
2009	36.3	36	106.7	469
2010	35.4	43	98.1	524
2011	40.6	73	97.0	217
2012	37.0	48	93.6	122
2013	33.0	29	85.0	59
Objective	**40**	**35**	**40**	**18**

Table 4.5 shows monitoring results from the Marylebone Road (FDMS) roadside automatic monitoring site. The PM_{10} annual mean objective has been met at this monitoring location in recent years. The PM_{10} 24-hour mean objective was exceeded at this monitoring location in 2009 and 2011.

This monitoring station is located on the A501 and is likely to be exposed to significant traffic emissions compared to conditions one would expect in the vicinity of the proposed development.

Table 4.5 - Annual Mean Concentrations at Marylebone Road (FDMS) monitoring location (µg/m^3)

Year	Concentration PM_{10}	No of 24-hour exceedences PM_{10}
2009	37.0	43
2010	31.6	23
2011	38.4	57
2012	30.8	-
2013	29.0	21
Objective	**40**	**35**

The results of background NO_2 diffusion tube monitoring at locations in the vicinity of the site are shown in **Table 4.6.** The results indicate that there were exceedences of the annual mean objective (40µg/m^3) at all urban background monitoring locations between 2009 and 2012.

Table 4.6 – Annual mean NO_2 concentrations at background diffusion tube sites (µg/m3)

Location	Distance from site	2009	2010	2011	2012	NO_2 Objective
Tavistock Gardens	800m	50.1	52.0	47.6	40.1	40
Russell Square Gardens	800km	44.5	44	N/A	N/A	40

The results of roadside NO_2 diffusion tube monitoring at locations in the vicinity of the site are shown in **Table 4.7**. The results indicate that the annual mean objective (40µg/m^3) was exceeded at all of the roadside monitoring locations between 2009 and 2012.

Table 4.7– Annual mean NO_2 concentrations at roadside diffusion tube sites (µg/m^3)

Location	Distance from site	2009	2010	2011	2012	NO_2 Objective
Goodge Street	160m	60.6	50.0	N/A	N/A	40
63 Gower Street	400m	82.6	74.0	N/A	N/A	40
Bloomsbury Street	600m	81.3	41.0	77.0	72.0	40

4.3 London Atmospheric Emissions Inventory

The London Atmospheric Emissions Inventory (LAEI)[17] and associated pollution maps, produced by the GLA, provide detailed estimates of pollution levels Londonwide. The July 2013 update indicates modelled pollutant concentrations in the vicinity of the proposed development shown below in **Table 4.8.**

Table 4.8- Modelled Pollution Levels in the Vicinity of the Proposed Development, Taken from London Atmospheric Emissions Inventory Pollution Maps (µg/m^3)

Pollutant	2012	2015	NO_2 / PM_{10} Objective
NO_2	46	43	40
PM_{10}	26	25	40

4.4 Pollutant Background Concentrations

Background concentrations of NO_X, NO_2 and PM_{10} were obtained from the UK Air Quality Archive (AQA)[18] for the 1 x 1km grid square for the proposed development, which is located within the grid square 528500, 182500. These background maps are available for each year up to 2030. Background NO_X, NO_2 and PM_{10} concentrations for 2013, 2015 (construction year) and 2017 (operational year) are shown in **Table 4.9**.

Table 4.9 - Background Pollutant Concentrations at Arthur Stanley House from the UK Air Quality Archive

Pollutant	2013 (µg/m^3)	2015 (µg/m^3)	2017 (µg/m^3)
NO_2	41.2	39.2	36.3
NO_x	70.9	67.1	61.1
PM_{10}	26.0	23.9	23.5

[17] GLA (2013), London Atmospheric Emissions Inventory 2010, *http://data.london.gov.uk/datastore/package/london-atmospheric-emissions-inventory-2010*

[18] Defra (2014), Emissions Factor Toolkit, http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html

5.0 Assessment of Effects

5.1 Construction Phase

5.1.1 Construction Dust

Specific management controls will be required to reduce the potential for dust impacts on the adjacent residential and commercial units.

Plant operating on the proposed development and construction vehicles entering and leaving the development could have the potential to contribute to local air pollution, particularly in respect of NO_2 and PM_{10}.

The traffic generation over the construction period is anticipated to peak at less than 50 heavy duty vehicles during the day. The impact of this traffic would be small in comparison to the existing road traffic movements on the main roads adjacent to the proposed development. Consequently, it is anticipated that the impact of construction vehicles entering and leaving the site would be would be negligible during the peak construction phase and the rest of the construction phase.

Screening

An assessment of construction dust effects is normally required if there are:

- human receptors within 350m of the site boundary, or within 50m of the route used by construction vehicles on a public highway, up to 500m from the site entrance; or
- ecological receptors within 50m of the site boundary; or within 50m of the route used by construction vehicles on a public highway, up to 500m from the site entrance.

If these criteria are not exceeded, it can be assumed that the level of risk from dust nuisance will be negligible and any effects will not be significant.

As human receptors are within 350m of the site boundary of the proposed development, a dust risk assessment has been undertaken. Ecological receptors are not present within 50m of the site boundary and have been screened out of this assessment.

Demolition

The dust emission class for demolition has been determined through taking into account the total building volume and type of building material to be demolished.

The volume of the building to be demolished has been estimated to be less than 20,000m^3; this, combined with the potentially dusty nature of the material comprising the structure to be demolished, indicates that the dust emissions class is likely to be medium.

Earthworks

No earthworks are anticipated during the development; therefore the dust effects from earthworks have not been assessed.

Construction

The total building volume to be constructed has been calculated to be between 25,000 and 100,000m^3. Materials with a high potential for dust release, such as concrete, will be used on site; and piling operations will also occur. Based on this the emissions category for this activity is likely to be medium.

Track out

Site access and egress will be to the south of the site along Tottenham Street. There will be between 10 and 50 vehicle movements from the site per day, putting the likely emission magnitude as medium.

Significance of Effects

The surrounding area has a medium density of residential properties, with the nearest located 20m to the north and east of the site. Residential properties have a high sensitivity to dust soiling and health effects, and between 10 and 100 are located within 20m of the development.

Using the IAQM guidance, the sensitivity of the surrounding area has been determined for dust soiling effects and health effects. This is shown in **Table 5.1**. The dust soiling effects sensitivity has been found to be high due to the close proximity of residential properties to the site. The health effects sensitivity of nearby residential receptors has been determined to be low, as, although residential properties are within close proximity of the site, the predicted ambient PM_{10} concentration in 2015 is 23.9µg/m^3.

Table 5.1- Sensitivity of the surrounding area

Potential impact	Sensitivity of the surrounding area			
	Demolition	**Earthworks**	**Construction**	**Track-out**
Dust soiling	Medium	N/A	Medium	Medium
Health effects	Low	N/A	Low	Low

In order to determine the dust soiling and health effects from track-out, 500m of the length of the predicted site exit route along the public highway has been assessed. The number of high sensitivity receptors within 20m of the route is more than 100; therefore the dust soiling effects are likely to be high and the health effects, medium. The sensitivity of the area to dust soiling and health effects from the on-site activities is shown in **Table 5.2.**

Table 5.2 - Summary – dust risk of site activities

Potential impact	Sensitivity of the surrounding area			
	Demolition	**Earthworks**	**Construction**	**Track-out**
Dust soiling	Medium risk	N/A	Medium risk	Low risk
Health effects	Low risk	N/A	Low risk	Low risk

The dust risk from the site ranges from low to high due to the moderate number of HGV movements and the density of sensitive receptors in the surrounding area combined with the low ambient concentration of PM_{10}.

Demolition and construction have the highest risk, with the potential to give rise to nuisance dust effects. Common nuisance dust effects would include the soiling of neighbouring windows, cars and signage. Health impacts from dust are unlikely at nearby receptors.

Mitigation measures will help negate some of the potentially negative air quality impacts resulting from the proposed development.

5.2 Operational Phase

The Arthur Stanley House development will be 'car-free'. Following discussions with the transport consultant at Crosby Transport Planning, it has been was determined that there will be a negligible impact on local traffic movements as a result of the proposed development.

The DMRB methodology[16] states that when a development is anticipated to generate a change in daily traffic flows of 1,000 AADT or more, an assessment is required. As no additional traffic is anticipated, air quality effects from road traffic as a result of the Arthur Stanley House development will not be significant.

5.2.1 Air Quality Neutral Assessment

In accordance with the Air Quality Neutral Planning Support guidance[19] published in support of the GLA SPG[9] in 2014, an air quality neutral assessment of the building emissions and boilers has been undertaken.

It is proposed that two boilers will be installed within the development, one supplying the offices (140kW output) and the other supplying the residential units (100kW output), with a backup boiler for each.

Building Emissions Benchmarks (BEBs) were calculated based on the gross floor area of different components of the proposed scheme. The emission benchmarks, including total building emissions benchmarks, are shown in **Table 5.3** below. The air quality neutral guidance gives emission benchmarks for specific land-use classes.

Calculated emissions from the proposed scheme are shown in

Table 5.4, based on emission rates for the boilers and an expected loading of 45 per cent (10 hours per day).

The calculated emissions for the proposed scheme are shown below the emission benchmarks. Therefore, the building emissions are fully compliant with a requirement for air quality neutrality.

[19] Air Quality Consultants and Environ. 2014. Air Quality Neutral Planning Support Update: GLA 80371

Table 5.3– Building Emissions Benchmark for Proposed Scheme

Description	Land use	Gross Floor Area (m^2)	BEB (gNO_x/m^2/ annum)	Benchmarked emissions ($kgNO_x$/ annum)
Business	B1	4,871	30.8	150.0
Residential	C3	2,020	26.2	52.9
		6,891	**Total benchmarked building emissions**	**202.95**

Table 5.4 – Calculated Building Emissions for Proposed Scheme

Plant	NOx (g/s)	Load	NOx (kg/annum)
Office boiler	0.00097	45%	13.58
Residential boiler	0.00136	45%	19.01
Total emissions			**32.59**

Transport Emissions Benchmarks (TEBs) have not been calculated for the development, as it is 'car-free' and no resulting change in traffic flows are predicted. Users of the development will not use off-site parking as the area surrounding the site has parking by permit only. Cycling provision has been made in the development for both the offices and residential units, with 19 spaces allocated to the offices and nine spaces allocated to the residential properties.

Emissions standards for boilers

The GLA SPG states that individual or communal boilers installed in commercial or domestic buildings should achieve a NO_X rating of <40mgNO_X/kWh. The boilers installed in the development will meet the ultra-low-NO_X emission performance of 35mg/kWh, as specified in the equipment data sheets.

This rating is within the minimum standard set out in the SPG.

6.0 Evaluation of Assessment Results

6.1 Developmental Constraints

This section considers air quality at the proposed development site in order to examine the suitability of the site for the intended use. The concentrations of air pollutants, particularly NO_2 and PM_{10}, may constrain the proposed development if they are sufficiently high or may require mitigation measures to be considered in the design of the development. Therefore it is important to determine what the pollutant levels will be when the development is completed and occupied; completion of the development is anticipated in 2017.

A baseline assessment of current air quality conditions at the site has been undertaken as outlined in **Section 4.0**.

Air quality dispersion modelling carried out by Camden Borough Council indicates that air quality conditions at the proposed development are likely to exceed the national air quality objective for NO_2 in 2015 and may continue to do so in 2017, although PM_{10} concentrations will be within objective levels.

Therefore it is likely that mitigation measures will be necessary to protect the future occupants of the development from adverse air quality conditions.

6.2 Operational Impacts

As outlined in **Section 5.2**, an assessment of the operational impacts has not been conducted as the proposed development will not impact local traffic flows. The impacts from the development itself can be considered neutral, thus requiring no further assessment.

6.3 Construction Impacts

The potential for construction and demolition activities to create pollution is dependent on a range of factors that are often specific to each site. Due to the variable nature of construction techniques and activities, it is difficult accurately to assess potential impacts, especially when they have not been identified.

As indicated in the methodology a more qualitative assessment has been conducted in identifying areas of potential risk and mitigation measures appropriate to the scale and type of construction.

7.0 Mitigation

7.1 Mitigation of Construction Dust

Under best practice guidance, the proposed development would constitute a medium risk for construction dust and there is the potential for occasional and minor impacts on nearby receptors.

The primary impacts associated with this development are likely to be in the form of dust generated during demolition and construction. The use of appropriate mitigation measures throughout the construction period will ensure that impacts to sensitive receptors are minimised or removed. The following best practice mitigation measures should be included in the construction method statement:

- Stakeholder engagement should be implemented through a stakeholder communication plan.
- The contact details for the individuals accountable for air quality and dust issues should be displayed at the site boundary.
- Complaints regarding air quality should be logged, and the log made available to the local authority on request.
- The site should be at least visually monitored for dust on a daily basis, with the frequency of monitoring increased during dry and windy conditions.
- The site should be organised so that:
  - physical barriers or screens are installed around the site to limit the dispersal of dust emissions; and
  - loose materials are covered as soon as possible.
- All mobile vehicles associated with the demolition or construction should comply with the standards of the London Low Emission Zone.
- Haul routes should be kept free from dust as far as possible, and swept regularly (water assisted). No dry sweeping of large areas will be carried out.
- Un-surfaced haul routes and working areas will be regularly damped down in dry conditions;
- All vehicles carrying loose or potentially dusty material to or from the working areas will be fully sheeted.
- Materials will not be burnt on site.
- Minimum drop heights will be used from conveyors, loading shovels and loading equipment.
- Provision of adequate water will be supplied to the working areas.
- Suitable dust suppression techniques such as water sprays or local extraction will be used when cutting, grinding or sawing materials onsite.
- Dust soiling checks and automatic monitoring of PM_{10} at sensitive receptors should be undertaken to ensure that the mitigation measures are being effective.
- PM_{10} concentration thresholds should be implemented at these locations, with exceedance alerts being sent to the individual responsible for air quality on the site. Where the site threshold is being significantly exceeded, work should cease on site until the source of the dust emissions is identified and negated.

These mitigation measures are intended to be a summary of the key controls specific to this site in order to minimise potential emissions. Provided these measures are used it is expected that emissions from the site during construction will not present a significant problem to local receptors.

These measures are not intended to be a comprehensive list of all best practice guidance; for more complete mitigation measures and control the GLA Supplementary Planning Guidance for construction and demolition sites[9] should be consulted.

7.2 Mitigation of Indoor Air Quality

This baseline assessment has concluded that the air quality conditions in the vicinity of Arthur Stanley House are not likely to meet the levels specified in national air quality objectives when the development is complete and operational. The design proposals have therefore incorporated mitigation measures for indoor air quality so that the occupants are not exposed to poor air quality.

The main building will house two air intake vents at level seven, located to the north of the building and 10m apart in line with BREEAM standards. The extension to Arthur Stanley House will also house two air intake vents at level five, which will be located to the north of the building and 10m apart in line with BREEAM standards. The air intake vents will be orientated away from the roadside and at height. Therefore, the intake air is likely to be less affected by traffic pollutants that would be found at ground level on the roadside.

In addition, the ventilation system will include high efficiency particulate air (HEPA) filtration (or S Class filtration) that meets British Standard 5415.

8.0 Conclusion

An air quality assessment has been undertaken for the development of Arthur Stanley House, a health care facility currently not in use. The development proposal is for offices and 14 residential units. The commercial and residential units will be set out over two basement floors and seven floors above.

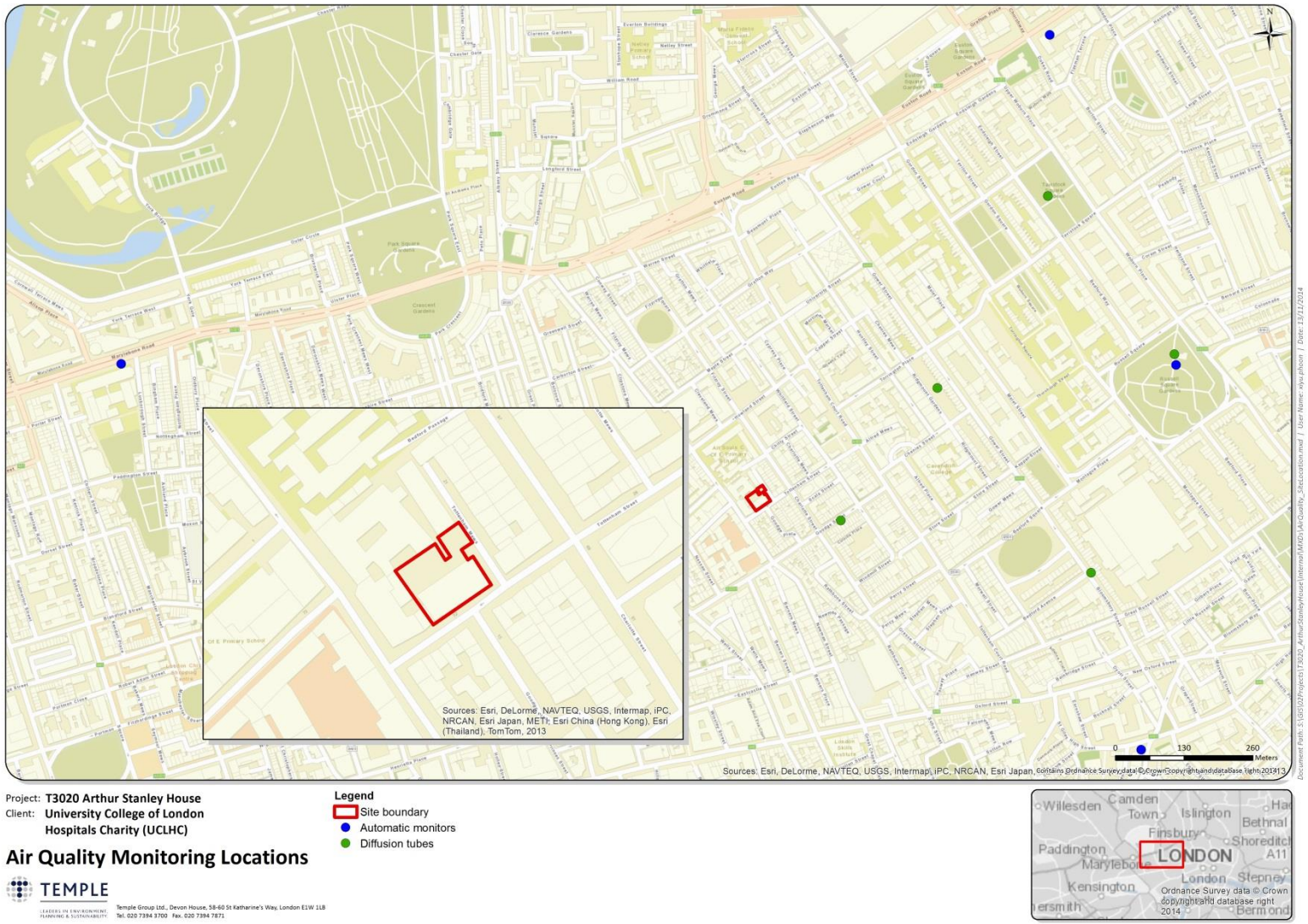
The suitability of the site for residential use, and the likely impacts from construction of the development were assessed.

The findings of Camden Council's air quality dispersion modelling results and the LAEI and Defra map predictions indicate that pollutant concentrations at 40-50 Tottenham Street are unlikely to meet the air quality objectives when the proposed development is complete and occupied. However following the implementation of design control mitigation measures, the occupants will not be exposed to poor indoor air quality.

The development site is located within close proximity to a number of residential properties and there is potential for these houses to be affected by emissions from the construction works if appropriate mitigation and control techniques are not implemented. However, given the relatively small size of the development and the fact that a substantial proportion of the building is being refurbished, the impacts are likely to be less significant.

This report outlines a number of key mitigation measures that should be utilised in order to minimize any potential impacts from construction. Provided these are maintained throughout the construction phase of the project it is not anticipated that any significant impacts at the development will arise.

Appendix I - Location Plan and Monitoring Positions


Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013
0
130
260
Meters
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, Contains Ordnance Survey data © Crown copyright and database right 2013
Project: T3020 Arthur Stanley House
Client: University College of London Hospitals Charity (UCLHC)
Air Quality Monitoring Locations
TEMPLE
Temple Group Ltd., Devon House, 58-60 St Katharine's Way, London E1W 1LB
Tel. 020 7394 3700 Fax. 020 7394 7871
Legend
Site boundary
Automatic monitors
Diffusion tubes
Willesden
Camden Town
Islington
Finsbury
Bethnal
Paddington
Marylebone
LONDON
Shoreditch
A11
Kensington
Stepney
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