



# Hawley Primary School

## Air Quality Assessment

April 2014

**Waterman Energy, Environment & Design Limited**

Pickfords Wharf, Clink Street, London SE1 9DG,  
[www.watermangroup.com](http://www.watermangroup.com)



# Hawley Primary School

## Air Quality Assessment

**Client Name:** Stanley Sidings Limited  
**Document Reference:** EED14474-100-R1.1.1.CB.docm  
**Project Number:** EED14474-100

### Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

---

Issue	Date	Prepared by	Checked by	Approved by
Draft	March 2014	Chris Brownlie Senior Consultant	Erwan Corfa Associate Director	Erwan Corfa Associate Director

### Comments

---

### Comments

---

#### Our Markets



Property & Buildings



Transport & Infrastructure



Energy & Utilities



Environment



## Disclaimer

This report has been prepared by Waterman Energy, Environment & Design Limited, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

## Content

<b>1. Introduction</b>	<b>1</b>
<b>2. Legislation and Planning Policy Context</b>	<b>2</b>
European Legislation	2
National Legislation	2
Local Authority Responsibility	3
National Planning Policy	4
National Planning Policy Framework, 2012	4
Regional Planning Policy	4
The London Plan, Spatial Development Strategy for Greater London, 2011	4
Revised Early Minor Alterations to the London Plan, 2013	5
Draft Further Alterations to the London Plan, 2014	5
Local Planning Policy	5
London Borough of Camden’s Site Allocations Proposed Submission Document, 2012	5
London Borough of Camden Core Strategy 2010-2025, 2010	5
London Borough of Camden Development Policies 2010-2025, 2010	5
Guidance	6
Environmental Protection UK: Planning for Air Quality, 2010	6
The Mayor’s Air Quality Strategy ‘Clearing the Air’, 2010	6
The Mayor’s Supplementary Planning Guidance - Sustainable Design and Construction, 2006	6
Mayor of London Best Practice Guidance - The Control of Dust and Emissions from Construction Sites, 2006	7
London’s Low Emission Zone, 2008	7
Low Emission Strategies – Good Practice Guide, 2010	7
London Borough of Camden Air Quality Action Plan, 2013	8
London Borough of Camden Guide for Contractors Working in Camden, 2008	8
Central London Air Quality Cluster Group, Cost Effective Actions to Cut Central London Air Pollution, 2012	9
<b>3. Assessment Methodology</b>	<b>10</b>
Construction Phase Assessment Methodology	10
Operational Phase Assessment Methodology	11
<b>4. Significance Criteria</b>	<b>16</b>
Construction	16
Completed Development	16
<b>5. Baseline Air Quality</b>	<b>18</b>
London Borough of Camden Review and Assessment Process	18
Local Monitoring	18
<b>6. Construction Phase Effects</b>	<b>19</b>

Nuisance Dust.....	19
Vehicle Emissions.....	20
<b>7. Operational Phase Effects .....</b>	<b>21</b>
Nitrogen Dioxide (NO <sub>2</sub> ) .....	21
<b>8. Mitigation Measures .....</b>	<b>24</b>
Construction Phase.....	24
Operational Phase .....	25
<b>9. Summary and Conclusions .....</b>	<b>26</b>

## Tables

Table 1: National Air Quality Strategy Objectives (England).....	3
Table 2: Dust Sensitive Receptors .....	11
Table 3: Selected Sensitive Receptors .....	12
Table 4: Heating Plant Stack Emission Parameters .....	14
Table 5: NO <sub>2</sub> Concentrations at Nearby Background Monitoring Sites.....	14
Table 6: Background Pollutant Concentrations used in the Assessment .....	14
Table 7: Construction Significance Criteria .....	16
Table 8: Magnitude of Change Descriptor in Relation to Changes in Annual Mean NO <sub>2</sub> .....	17
Table 9: Significance Criteria for Annual Mean NO <sub>2</sub> .....	17
Table 10: Modelled NO <sub>2</sub> Concentrations at Sensitive Receptors.....	21

## Figures

- Figure 1: Modelled Air Quality Sensitive Receptors and Stack Location
- Figure 2: Wind Rose of the London City Airport 2013 Meteorological Data
- Figure 3: CHP and Boiler Load Profile

## 1. Introduction

- 1.1. Waterman Energy, Environment & Design Limited (hereafter referred to as 'Waterman EED') has been commissioned by Stanley Sidings Ltd (hereafter referred to as the 'Applicant') to carry out an assessment to determine the effect of the proposed Hawley Primary School heating plant exhaust emissions on local air quality. Hawley Primary School (hereafter referred to as the 'Development') would be located at 1 Hawley Road, London (hereafter referred to as the 'Site').
- 1.2. The Site is located within the London Borough of Camden (LBC). LBC has declared an Air Quality Management Area (AQMA) (area where there is public exposure to pollutant concentrations that exceed the Air Quality Strategy (AQS) objectives) for the whole Borough for the annual mean nitrogen dioxide (NO<sub>2</sub>) and the 24-hour mean particulate matter (as PM<sub>10</sub>) AQS objectives. As such, an assessment has been undertaken to predict the changes in pollutant concentrations, and determine the effect of these changes on nearby existing receptors, and future sensitive receptors within the Site.
- 1.3. The Site is bounded by Hawley Road to the north, and terraced housing on Kentish Town Road to the east. A railway line which is earmarked as part of High Speed 2 is located to the south of the Site with 'Area B' of the proposed Camden Lock Village (outline consent 2012/4628/P) located to the west of the Site.
- 1.4. Due to its size and nature, the Development would not generate any significant additional traffic. Therefore, there would be no significant increase in pollutant emissions due to road traffic.
- 1.5. However, the Development would include a heating plant, comprising one Combined Heat and Power (CHP) unit and two boiler units. This air quality assessment therefore takes into account additional pollutant emissions from the proposed heating plant. The likely increase in air pollutant concentrations that existing nearby residents and future users of the Development would be subject to has been determined using an air pollution dispersion model. Modelled results have been used to determine the significance of effects for the operational phase of the Development. In addition, the significance of effects of the construction phase on air quality has been determined, based on a qualitative assessment.
- 1.6. Section 2 of this report gives a summary of legislation and planning policy relevant to air quality. Section 3 sets out the methodology used in the assessment. Section 4 sets out the significance criteria used to determine the significance of effects. Section 5 provides a summary of the baseline conditions at and around the Site. Section 6 provides the construction phase effects and Section 7 the effects of the Development on local air quality once completed. Mitigation measures required to minimise any adverse effects are discussed in Section 8, and a summary of the main findings and conclusions of the assessment is given in Section 9.

## 2. Legislation and Planning Policy Context

### European Legislation

- 2.1. Air pollutants at high concentrations can give rise to adverse impacts on the health of humans and ecosystems. European Union (EU) legislation on air quality forms the basis for national UK legislation and policy on air quality.
- 2.2. The European Union Framework Directive 2008/50/EC<sup>1</sup> on ambient air quality assessment and management came into force in May 2008 and was implemented by Member States, including the UK, by June 2010. The Directive aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants.

### National Legislation

#### Air Quality Standards

- 2.3. The Air Quality Standards Regulations 2010<sup>2</sup> implement Limit Values prescribed by the Directive 2008/50/EC. The Limit Values are legally binding and the Secretary of State, on behalf of the UK Government, is responsible for their implementation.

#### The UK Air Quality Strategy

- 2.4. In a parallel process, the Environment Act 1995<sup>3</sup> required the preparation of a national air quality strategy setting health-based air quality objectives for specified pollutants and outlining measures to be taken by local authorities in relation to meeting these (the Local Air Quality Management (LAQM) regime).
- 2.5. The UK Air Quality Strategy (AQS)<sup>4</sup>, adopted in 1997, was subsequently reviewed and revised in 2000 as the Air Quality Strategy for England, Scotland, Wales and Northern Ireland<sup>5</sup>; and a further amendment was published in 2003<sup>6</sup>.
- 2.6. The current UK AQS was published in 2007<sup>7</sup> and updates the original strategy to set out new objectives (referred to hereafter as the 'AQS objectives') for local authorities in undertaking their local air quality management duties. The 2007 UK AQS introduces a national level policy framework for exposure reduction for fine particulate matter.
- 2.7. Objectives in the current UK AQS are in some cases more onerous than the Limit Values set out within the relevant EU Directives and the Air Quality Standards Regulations 2010. In addition, the AQS objectives were established for a wider range of pollutants.
- 2.8. The Limit Values and AQS objectives of air pollutants relevant to this assessment are summarised in Table 1 below.

<sup>1</sup> European Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe

<sup>2</sup> Defra, 2010, 'The Air Quality Standards Regulations'

<sup>3</sup> Office of the Deputy Prime Minister (ODPM), 1995, 'The Environment Act 1995'

<sup>4</sup> Department of the Environment (DoE), 1997, 'The UK National Air Quality Strategy'

<sup>5</sup> Department of the Environment, Transport and the Regions (DETR), 2000, 'UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland'

<sup>6</sup> Defra, Scottish Executive, Welsh Assembly Government and the Department of the Environment in Northern Ireland, 2003, 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: (Addendum)'

<sup>7</sup> Defra, 2007, 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland'



Table 1: National Air Quality Strategy Objectives (England)

Pollutant	Objective		Date by which Objective is to be met
	Concentration	Measured as	
Nitrogen dioxide (NO <sub>2</sub> )	200µg/m <sup>3</sup>	1-hour mean not to be exceeded more than 18 times per year	31/12/2005
	40µg/m <sup>3</sup>	Annual mean	31/12/2005
Particulate Matter (PM <sub>10</sub> ) <sup>(a)</sup>	50µg/m <sup>3</sup>	24-hour mean not to be exceeded more than 35 times per year	31/12/2004
	40µg/m <sup>3</sup>	Annual mean	31/12/2004
Particulate Matter (PM <sub>2.5</sub> ) <sup>(b)</sup>	Target of 15% reduction in concentrations at urban background locations	Annual mean	Between 2010 and 2020
	Variable target of up to 20% reduction in concentrations at urban background locations <sup>(c)</sup>	Annual mean	Between 2010 and 2020
	25µg/m <sup>3</sup>	Annual mean	01/01/2020

(a) Particulate Matter with a mean aerodynamic diameter of less than 10µm (micrometres or microns)

(b) Particulate Matter with a mean aerodynamic diameter of less than 2.5µm

(c) Aim to not exceed 18µg/m<sup>3</sup> by 2020

- 2.9. There are currently no statutory UK standards in relation to deposited dust and its propensity to cause nuisance, although an annual deposition rate of 200mg/m<sup>2</sup>/day is often used as a threshold value, over which significant nuisance effects are likely<sup>8</sup>.

### Local Authority Responsibility

- 2.10. Part IV of the Environment Act 1995 provides a system of LAQM, under which local authorities are required to review and assess air quality in their area by way of a staged process. Should this process suggest that any of the AQS objectives will not be met by the target dates, the local authority must consider the declaration of an Air Quality Management Area (AQMA) and the subsequent preparation of an Air Quality Action Plan (AQAP) to improve the air quality in that area in pursuit of the objectives.
- 2.11. LBC designated the whole borough as an AQMA in 2002 for the annual mean NO<sub>2</sub> and 24-hour mean PM<sub>10</sub>. A summary of LBC's review and assessment of air quality is provided in 'Section 5: Baseline Air Quality'. As a result of the declaration of an AQMA, LBC was required to produce an AQAP, to set out measures to reduce pollution within the Borough. A summary of the LBC AQAP, recently updated (2013), is provided in the 'Guidance' section below.

<sup>8</sup> Bate, K. J. and Coppin, N. J. ,1991, 'Dust impacts from mineral workings, Mine and Quarry' - 20 (3), pp31 – 35.

## National Planning Policy

### National Planning Policy Framework, 2012

2.12. Published in March 2012, the National Planning Policy Framework (NPPF)<sup>9</sup> replaced with immediate effect the majority of existing national planning policy guidance, including Planning Policy Guidance and Planning Policy Statements.

2.13. The NPPF identifies that the planning system should aim to conserve and enhance the natural and local environment by:

*...“preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of land, air, water or noise pollution or land instability.”*

2.14. Furthermore, it 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”.*

## Regional Planning Policy

### The London Plan, Spatial Development Strategy for Greater London, 2011

2.15. Policy 7.14 ‘Improving air quality’ of the adopted London Plan<sup>10</sup> states that development proposals should:

*“A. 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);*

*B. promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils’ ‘The control of dust and emissions from construction and demolition’;*

*C. 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));*

*D. 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 approach; and*

*E. 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.”*

<sup>9</sup> Department for Communities and Local Government, 2012, ‘National Planning Policy Framework’

<sup>10</sup> Mayor of London, July 2011, ‘The London Plan: Spatial Development Strategy for Greater London’

### Revised Early Minor Alterations to the London Plan, 2013

- 2.16. The Revised Early Minor Alterations to the London Plan (REMA)<sup>11</sup> document was published to ensure that the London Plan is fully consistent with the NPPF. There are no alterations to the air quality policy summarised above in the REMA.

### Draft Further Alterations to the London Plan, 2014

- 2.17. In January 2014, the Mayor published Draft Further Alterations to the London Plan (FALP) for public consultation. There are no alterations to the air quality policy summarised above in the FALP.

## Local Planning Policy

### London Borough of Camden's Site Allocations Proposed Submission Document, 2012

- 2.18. The LBC Site Allocations Document<sup>12</sup> states that:

*"As set out in the Core Strategy, the Council will support and promote the Central London area of Camden as a successful and vibrant part of the capital to live in, work in and visit. We will:*

*...continue to designate Central London as a Clear Zone Region to reduce congestion, promote walking and cycling and improve air quality."*

### London Borough of Camden Core Strategy 2010-2025, 2010

- 2.19. The LBC Core Strategy<sup>13</sup> sets out the key elements of the Council's vision for the borough. Policy CS9 - Achieving a successful Central London states:

*"The Council will support and promote the Central London Area of Camden as a successful and vibrant part of the capital to live in, work in and visit. We will:*

*...k) continue to designate Central London as a Clear Zone Region to reduce congestion, promote walking and cycling and improve air quality;"*

- 2.20. Policy CS16 - Improving Camden's health and well-being states:

*"The Council will seek to improve health and well-being in Camden. We will:*

*...e) recognise the impact of poor air quality on health and implement Camden's Air Quality Action Plan which aims to reduce air pollution levels."*

### London Borough of Camden Development Policies 2010-2025, 2010

- 2.21. The LBC Development Policies 2010-2025<sup>14</sup> sets out the detailed planning criteria that LBC will use to determine applications for planning permission in the borough. Policy DP32: 'Air quality and Camden's Clear Zone' states:

*"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."*

<sup>11</sup> Mayor of London, October 2013, 'Revised Early Minor Alterations to The London Plan'

<sup>12</sup> LBC, March 2012, 'Camden Site Allocations Proposed Submission Document'

<sup>13</sup> LBC, 2010, 'Camden Local Development Framework Camden Core Strategy 2012-2025 - Adopted Version 2010'

<sup>14</sup> LBC, November 2010, 'Camden Development Policies 2010-2025 Local Development Framework'

*The Council will also only grant planning permission for development in the Clear Zone region that significantly increases travel demand where it considers that appropriate measures to minimise the transport impact of development are incorporated. We will use planning conditions and legal agreements to secure Clear Zone measures to avoid, remedy or mitigate the impacts of development schemes in the Central London Area."*

2.22. The Site is located within the Clear Zone.

## **Guidance**

### **Environmental Protection UK: Planning for Air Quality, 2010**

2.23. The Environmental Protection UK's (EPUK) Development Control: Planning for Air Quality (Update 2010) document<sup>15</sup> advises:

*"in arriving at a decision about a specific proposed development the [Local Planning Authority] is required to achieve a balance between economic, social and environmental considerations."*

### **The Mayor's Air Quality Strategy 'Clearing the Air', 2010**

2.24. The GLA Act 1999 required the GLA to produce an Air Quality Strategy<sup>16</sup> for Greater London to set out air quality objectives (to be no less than national objectives), assess, present and forecast future air quality, and present measures the Mayor, GLA and other functional bodies (e.g. London Boroughs and Local Planning Authorities (LPAs) bordering London) will take towards meeting these objectives. As such, the objectives of the Mayor's Strategy will be met if the national objectives are met.

2.25. The current Mayor's Air Quality Strategy was adopted in 2010<sup>17</sup> and sets out a framework for delivering improvements to London's air quality. Such measures are aimed at reducing emissions from transport, homes, offices and new developments, as well as raising awareness of air quality issues.

### **The Mayor's Supplementary Planning Guidance - Sustainable Design and Construction, 2006**

2.26. This Supplementary Planning Guidance (SPG) on Sustainable Design and Construction<sup>18</sup> provides additional information to support the implementation of the London Plan and sets out what can be done within the current policy framework to design and construct new developments in ways that contribute to sustainable development. It focuses on the aspects of design and construction that relate to a specific site, rather than to the wider context of the area.

2.27. In relation to air pollution, low emission developments that are designed to minimise the air quality impact of plant, vehicles and other sources over the lifetime of the development are encouraged. Key principles include ensuring that building services plant has the lowest emissions practicable, and taking measures to reduce and mitigate exposure to air pollution.

<sup>15</sup> Environmental Protection UK, 2010, 'Development Control: Planning for Air Quality (2010) Update'

<sup>16</sup> Greater London Authority (GLA), 2002, 'The Mayor's Air Quality Strategy: Cleaning London's Air'

<sup>17</sup> The Mayor's Air Quality Strategy, 2010, 'Clearing the Air'

<sup>18</sup> Mayor of London, 2006, 'The Mayor's Draft Supplementary Planning Guidance – Sustainable Design and Construction'

## Mayor of London Best Practice Guidance - The Control of Dust and Emissions from Construction Sites, 2006

- 2.28. The guidance set out in 'The Control of Dust and Emissions from Construction Sites'<sup>19</sup> outlines best practice and provides a consistent approach covering all aspects of dust control and emissions from construction and demolition activities.
- 2.29. This Guidance builds on Building Research Establishment (BRE) Guidance and individual LPA's Considerate Contractors' Schemes, together with the experience of LPA officers. It establishes best practice and control measure packages that are relevant and achievable, with the overarching aim of protecting public health. It also aims to provide an overall mechanism to deal with the cumulative impacts of the many individual construction sites within a London borough.
- 2.30. This Guidance builds on, and aims to replace or amend relevant parts of individual borough's existing Code of Construction Practice documents.
- 2.31. The Mayor has issued for public consultation a draft SPG on The Control of Dust and Emissions during Construction and Demolition<sup>20</sup>, which will replace the current best practice guidance.

## London's Low Emission Zone, 2008

- 2.32. On 3 May 2007, the Mayor confirmed the introduction of the London Low Emission Zone (LEZ). The LEZ covers most of Greater London. This decision was taken following the publication of the Mayor's revisions to the Transport and Air Quality Strategies in July 2006. All roads (including those at Heathrow and the M1 and M4 motorways, except the M25) fall within the zone. Phased introduction of the LEZ scheme started on 4 February 2008 and will be gradually implemented through to January 2012. The LEZ is a specified area within which the most polluting diesel-engine trucks, buses, coaches, large vans and minibuses will be required to meet specified Euro emissions targets. Where such vehicles do not meet the specified emission targets, a charge will be levied. From the 3 January 2012 the LEZ became more stringent with vehicles required to meet the Euro IV standard for particulate matter.

## Low Emission Strategies – Good Practice Guide, 2010

- 2.33. In January 2010, Defra published good practice guidance<sup>21</sup> for advising local authorities on ways in which the planning system may be used to reduce transport emissions and thus improve air quality. The guidance provides local authorities with typical measures and examples of good practice including:
- On-site parking - residential / customer parking spaces set aside for car clubs or low emission vehicles;
  - Low emission infrastructure – provision of providing electric charging bays or low emissions fuelling points, cycle rental schemes, development and promotion of car clubs;
  - Innovative and creative ideas;
  - Commitments via procurement and supply chains; and
  - Contributions to local plans – standardised for all developments over a certain threshold but related to the actual impact.

<sup>19</sup> Mayor of London, 2006, 'Mayor of London Best Practice Guidance – The Control of Dust and Emissions from Construction Sites'

<sup>20</sup> Mayor of London, 2013, 'The control of dust and emissions during construction and demolition: Draft Supplementary Planning Guidance' - Published for Public Consultation September 2013

<sup>21</sup> Defra, 2010, 'Low Emissions Strategies using the planning system to reduce transport emissions, good practice guidance'

### London Borough of Camden Air Quality Action Plan, 2013

- 2.34. The LBC Air Quality Action Plan (AQAP), Camden's Clean Air Action Plan 2013-2015 (updated in 2013)<sup>22</sup> sets out a number of measures to deliver improvements to air quality within the borough. The Plan comprises four themes which are:
- *“Reducing transport emissions;*
  - *Reducing emissions associated with new development;*
  - *Reducing emissions from gas boilers and industrial processes; and*
  - *Air quality awareness-raising initiatives.”*
- 2.35. Within each of these themes are a number of objectives and actions LBC will take to reduce emissions within the Borough.

### London Borough of Camden Guide for Contractors Working in Camden, 2008

- 2.36. LBC have produced a guide<sup>23</sup> to reduce disturbances due to dust and smoke arising from demolition and construction work on all building sites within the borough. The document sets out Best Practice Means (BPM) to mitigate dust emissions from construction sites these include:

*“a. Carry out demolition and construction work in accordance with the Best Practise Guidance Note ‘The control of dust and emissions from construction and demolition’ (2006). This outlines BPM to effectively manage construction work in order to mitigate air pollution emissions.*

*b. When carrying out demolition or construction work during periods of dry or windy weather, there can often be dust problems on sites bordered by homes. You must take measures to reduce the formation and spread of dust. You must control dust at source by using a continuous fine-water spray. You must provide a suitable water supply, and make sure there are enough hoses to reach all parts of the site and a way of getting rid of wastewater.*

*c. There must be adequate screening and damping down during all demolition activities, sandblasting, clearance work, breaking up of existing ground services and other site preparations and activities. You must use existing features of the site, such as boundary walls to provide screening where practicable.*

*d. You must enclose scaffolding with appropriate sheeting material.*

*e. You must provide easy-to-clean hard-standings for vehicles.*

*f. You must keep heavily used areas clean by brushing vehicles and spraying them with water regularly.*

*g. You must control the cutting or grinding of materials on the site.*

*i. Buildings or structures that are being demolished, or small areas of land that are being prepared for development must be damped down using high-pressure hoses.*

*k. On sites where a large amount of dust has been produced and is laying on the ground, you must use a specialist vehicle to remove dust (by vacuuming) before you damp down the site.*

*l. Major haul routes on the site must be watered as necessary to reduce dust. Where practical, you must compact the route to reduce the amount of soil and other material that is moved around the site. This applies especially near to exits. If machinery movements produce dust, you must set effective speed limits and reschedule work if necessary. If the development involves machinery moving across open land, you must create a suitable track to reduce the amount of dust produced.*

<sup>22</sup> LBC, 2013, 'Camden's Clean Air Action Plan 2013-2015'

<sup>23</sup> LBC, 2008, 'Guide for Contractors Working in Camden'

- m. You must enclose materials at all times, and damp down dusty materials using water sprays during dry weather.*
- n. All materials that create dust, including soil, must be stored away from the site boundary, screened to prevent wind spreading the dust and damped down where practical. You will need to consider the size and shape of stockpiles to reduce dust.*
- o. Paved roads near to exits must be kept clean. Vehicles transporting materials onto or off the site must be suitably covered where necessary to prevent dust.*
- p. You must use rubble chutes and skips where appropriate. There must be an effective close-fitting cover over the skip to contain all the dust and other rubbish. The chutes must be continuous until they reach the skip, with no gaps, and maintained in good condition.*
- q. You must not allow rubbish and waste materials to build up on the site.*
- r. You must plant, turf or securely cover completed earthworks to stabilise the surface.*
- s. Reducing dust, fumes or other nuisance or environmental effects, which may cause offence to the local community or environment.*
- t. Reduce environmental effects which may cause offence to the local community by promoting proactive community relations.”*

### Central London Air Quality Cluster Group, Cost Effective Actions to Cut Central London Air Pollution, 2012

- 2.37. The Central London Air Quality Cluster Group consists of the amalgamation of eight central London Boroughs, including LBC, to improve air quality within central London. The Cost Effective Actions to Cut Central London Air Pollution guidance<sup>24</sup> provides action measures which London Boroughs can implement to improve air quality. Such measures range from business engagement, car clubs, encouraging cycling, to energy efficiency in buildings and ultra-low NO<sub>x</sub> boilers. The following measures are applicable to the proposed Development:
- New buildings to be air quality neutral;
  - New buildings to include a CSH or BREEAM Level 4 assessment; and
  - Boilers are replaced by ultra-low NO<sub>x</sub> models instead of Class 4 or 5.

<sup>24</sup> Central London Air Quality Cluster Group, 2012, 'Cost Effective Actions to Cut Central London Air Pollution'

### 3. Assessment Methodology

3.1. This air quality assessment was undertaken using a variety of information and procedures as follows:

- Review of LBC's air quality Review and Assessment statutory reports published as part of the LAQM regime in order to quantify baseline conditions in the area of the Site;
- Review of the local area to identify existing sensitive receptor locations, that could be affected by changes in air quality arising from the construction works and the operation of the Development;
- Identification of potential sensitive receptors proposed as part of the Development;
- Application of atmospheric dispersion modelling using the ADMS™ model<sup>25</sup> to predict the likely pollutant concentrations at the Site and the effects of the completed Development on local air quality due to the additional emissions that would be generated by the proposed heating plant;
- Comparison of the predicted air pollutant concentrations with the relevant AQS objectives;
- Determination of the effects of the operational phase of the Development on air quality, based on the application of the EPUK significance criteria to modelled results;
- Determination of the effects of proposed construction activities; and
- Identification of mitigation measures, where appropriate.

#### Construction Phase Assessment Methodology

3.2. Potential adverse impacts on air quality throughout the construction works are likely to be caused by dust-generating activities and emissions from construction plant and vehicles both on and accessing the Site. Potentially, nuisance can be caused by the deposition of construction dust.

3.3. Construction-derived dust effects cannot be easily quantified and therefore a more qualitative approach was employed to predict potential effects from these works. The emphasis of this approach lies in the minimisation of potential dust effects at source through appropriate environmental management controls relating to, at least, 'good practice' site management practices. In particular, this included:

- Consideration of the likely processes involved in relation to the construction works;
- Consideration of the likely operation of plant and machinery associated with the construction works;
- Consideration of the likely generation of construction vehicle movements, including heavy-goods vehicles (HGVs); and
- Identification of good working practices and suitable mitigation measures in order to minimise the potential for dust emissions, and nuisance risk.

3.4. Premises and occupants within 100m of a construction site are generally considered to experience the most significant effects from construction dust. Examples of dust-sensitive receptors<sup>26</sup> are listed in Table 2.

<sup>25</sup> Cambridge Environmental Research Consultants (CERC), November 2012, Atmospheric Dispersion Modelling System (ADMS) v5.0

<sup>26</sup> Department for Communities and Local Government, 2012, 'Technical Guidance to the National Planning Policy Framework'



Table 2: Dust Sensitive Receptors

High Sensitivity	Medium Sensitivity	Low Sensitivity
Hospitals and Clinics	Schools	Farms
Retirement Homes	Residential Areas	Light and Heavy Industry
Hi-Tech Industries	Food Retailers	Outdoor Storage
Food Processing	Offices	

- 3.5. The proximity of sensitive receptors and their orientation in relation to the prevailing wind, in addition to the scale and duration of construction activities, would have a bearing on potential nuisance effects.

## Operational Phase Assessment Methodology

### Model

- 3.6. This air quality assessment has been based on the advanced atmospheric dispersion model ADMS<sup>TM</sup>, used to model the atmospheric dispersion of pollutant emissions from the proposed heating plant<sup>27</sup>.
- 3.7. ADMS is a Gaussian atmospheric dispersion model widely used for investigating air pollution from controlled or fugitive emissions. The model is used for a wide range of air quality assessments, from small energy centres in urban areas to large industrial facilities. It is also used to model the dispersion of odours to determine the potential for nuisance at sensitive receptors around installations. The model uses advanced algorithms for the height-dependence of wind speed, turbulence and atmospheric stability which improve calculations of air pollutant concentrations. It can predict long-term and short-term concentrations, as well as concentration percentiles.
- 3.8. ADMS is developed in the UK by CERC (Cambridge Environmental Research Consultants), and has been extensively validated against field data sets in order to assess various configurations of the model such as flat or complex terrain, line/area/volume sources, buildings, dry deposition, fluctuations and visible plumes. Further information in relation to the model validation is available from the CERC web site at [www.cerc.co.uk](http://www.cerc.co.uk).

### Model Scenario

- 3.9. Dispersion modelling of stack emissions from the proposed heating plant has been carried out for the year 2013, considered to represent a “worst-case” assessment scenario, as current guidance suggests that there is a progressive reduction in background concentrations for future years associated with technological advances in vehicle emissions.

### Pollutants Assessed

- 3.10. The proposed heating plant would use natural gas. The main pollutants of concern from the combustion of natural gas are oxides of nitrogen (NO<sub>x</sub>) - which consist of nitric oxides (NO) and nitrogen dioxide (NO<sub>2</sub>). Particulate matter (PM) emissions due to the combustion of natural gas are typically not significant and have therefore not been considered further.
- 3.11. Of NO<sub>x</sub>, it is NO<sub>2</sub> that is the main pollutant of concern due to its adverse effects on human health. Typically, the proportion of NO<sub>2</sub> in NO<sub>x</sub> exhaust emissions from boilers and CHP units is small, as NO<sub>x</sub> is mostly emitted as NO. However, once released in the atmosphere, additional NO<sub>2</sub> is formed

<sup>27</sup> Cambridge Environmental Research Consultants (CERC), November 2012, Atmospheric Dispersion Modelling System (ADMS) v5.0

due to chemical reactions between emitted NO and atmospheric ozone (O<sub>3</sub>). This assessment, therefore, focuses on NO<sub>2</sub>.

### Sensitive Receptors

- 3.12. The approach adopted by the Air Quality Strategy is to focus on areas at locations where members of the public (in a non-workplace area) are likely to be exposed to pollutants over the averaging time of the objective in question (i.e. for the pollutants considered in this assessment, over 1-hour, 24-hour or annual periods). In urban areas, exceedences of the AQS objectives principally relate to annual mean NO<sub>2</sub> and PM<sub>10</sub>, and 24-hour mean PM<sub>10</sub>, so that potentially sensitive locations relate mainly to residential properties and other sensitive locations (such as schools, hospitals and care homes) where the public may be exposed for prolonged periods.
- 3.13. Table 3 presents existing sensitive receptors (residential properties and receptors within the school) that have been selected due to their proximity to the proposed heating plant stack. Receptors R1 to R13 are representative of existing residential properties closest to the school roof level, and therefore more likely to be impacted by the heating plant stack emissions.
- 3.14. Locations representative of future sensitive uses (residential properties) within the adjacent Camden Lock Village development were also considered (Receptors R14 and R15). A location representative of the outdoor classroom on the school roof terrace was also considered (Receptor R16). This represents the area of the Development likely to be exposed to the maximum potential increase in pollution due to the heating plant stack emissions. Receptor locations identified for this assessment are presented in Figure 1.

Table 3: Selected Sensitive Receptors

Receptor ID	Address of Receptor	OS Grid Reference		Z (m)	Distance and Direction from Stack
		X (m)	Y (m)		
R1	6 Hawley Road	528813	184316	13.5	53m NW
R2	174 Camden Street	528971	184280	15	116m E
R3	1A-1E Jefferys Street	528973	184307	13.6	120m E
R4	1-24 Bradfield Court, Torbay Street	528906	184307	17.7	57m NE
R5	53-55 Camden Gardens	528955	184171	19.7	150m SE
R6	22A Castlehaven Road	528789	184283	13.4	65m W
R7	1-84 Durban House	528973	184404	19.4	169m NE
R8	236 Royal College Street	529024	184479	19.8	260m NE
R9	1-8 Ellen Terry Court, Farrier Street	528916	184414	15.4	145m N
R10	10 Chalk Farm Road	528680	184185	3.5	200m SW
R11	1 Grand Union Way	528950	184110	13.5	196m SE
R12	214-216 Camden High Street	528867	183917	7	365m S
R13	1 Hawley Road	528898	184276	9.6	43m E
R14	Building X Camden Lock Village (Floor 4)	528842	184280	10	13m W
R15	Building W Camden Lock Village	528847	184265	12	20m SW
R16*	Outdoor Classroom	528875	184280	7.6	20m E

\* Proposed school receptor as part of the Development

### Meteorological Data

- 3.15. Local meteorological conditions strongly influence the dispersion of air pollutants. Key meteorological data for dispersion modelling include wind direction, wind speed, temperature,

precipitation and the extent of cloud cover for each hour of a given year. As a minimum, ADMS requires wind speed, wind direction, and cloud cover.

- 3.16. Meteorological data, to input into the model, were obtained from the London City Airport Meteorological Station, for the year 2013, the most recent year with available data. This meteorological station, approximately 13km southeast of the Site, is considered to be the most representative of the local weather conditions on the Site. Figure 2 presents the wind-rose for the meteorological data, where the dominant south-westerly winds, can be clearly identified, although easterly winds are significant as well.
- 3.17. Most dispersion models do not use meteorological data if they relate to calm winds conditions, as dispersion of air pollutants is more difficult to calculate in these circumstances. ADMS treats calm wind conditions by setting the minimum wind speed to 0.75m/s. It is recommended in Technical Guidance LAQM.TG(09)<sup>28</sup> that the meteorological data file be tested within a dispersion model and the relevant output log file checked, to confirm the number of missing hours and calm hours that cannot be used by the dispersion model. This is important when considering predictions of high percentiles and the number of exceedences. Technical Guidance LAQM.TG(09) recommends that meteorological data should only be used if the percentage of usable hours is greater than 75%, and preferably 90%. 2013 meteorological data from London City Airport include 8,353 lines of usable hourly data out of the total 8,760 for the year, i.e. 95% of usable data. This is above the 75% threshold, and is therefore adequate for the dispersion modelling.

#### Heating Plant Characteristics

- 3.18. Stack parameters were provided by Waterman Building Services. The Development would comprise one CHP and two boiler units fuelled by natural gas. Exhaust gases would be discharged to air via stacks at building roof level. The stack parameters and emissions data used for the dispersion modelling are provided in Table 4 below. As discussed in the above Section 'Pollutants Assessed', only NO<sub>x</sub> emissions have been considered as PM emissions are considered negligible. The location of the stack is illustrated in Figure 1.
- 3.19. Emissions from the CHP and boilers would vary by hour of the day and month of the year. Waterman Building Services provided a load profile for the CHP and boiler units for a full calendar year, which has been included in the model, allowing variable emissions to be taken into account. The load profile is presented in Figure 3.
- 3.20. The following additional worst-case assumption has been used for the assessment of effects of heating plant emissions on local air quality: as NO<sub>2</sub> is the pollutant of concern in relation to human health, assumptions need to be made on the proportion of NO emissions oxidised to NO<sub>2</sub> by the time the plume reaches sensitive receptors. This is commonly referred to as the NO<sub>x</sub> to NO<sub>2</sub> conversion ratio. For this assessment, it has been assumed that all emitted NO<sub>x</sub> would be converted to NO<sub>2</sub> at sensitive receptors.

<sup>28</sup> Defra, 2009, 'Local Air Quality Management Technical Guidance LAQM.TG (09)'

Table 4: Heating Plant Stack Emission Parameters

Unit	Number	Output / Unit (kW <sub>t</sub> )	Total Output (kW <sub>t</sub> )	Stack Location (OS Grid Coordinates)		Stack Parameters				Total NO <sub>x</sub> Emission Rate (g/s)
				X	Y	Release Height (m)	Flue Diameter (m)	Temperature of Release (°C)	Velocity of Release (m/s)	
Boiler	2	162	324	52885	184282	9.9	2 x 0.15	60	5.3	0.0011
CHP	1	13.5	13.5				0.08	75	1.8	0.0014

### Background Concentrations

- 3.21. Dispersion modelling requires background pollutant concentration data (i.e. concentrations due to the contribution of pollution sources not directly taken into account in the dispersion modelling), which is added to contributions from modelled pollution sources.
- 3.22. Current projections for future years show a progressive reduction in background concentrations. As a worst-case scenario, the background pollution data for the year 2013 have been used in this assessment.
- 3.23. Background pollution data for NO<sub>2</sub> published by Defra are available from the LAQM Support website<sup>29</sup>, providing projections as an annual mean for the UK at a 1km<sup>2</sup> resolution and for years 2010-2030. The NO<sub>2</sub> background concentration for the 1km<sup>2</sup> grid square encompassing the Site (528500, 184500) was 35.9µg/m<sup>3</sup> in 2013.
- 3.24. There are also a number of urban background NO<sub>2</sub> diffusion tube monitoring sites in Camden and Islington within 2.5km of the Site. The most recent results (for the year 2012, as 2013 results are not available yet) for these sites are provided in Table 5 below.

Table 5: NO<sub>2</sub> Concentrations at Nearby Background Monitoring Sites

Site	Site Type *	Distance to Development (km)	Monitoring Type	Local Authority	NO <sub>2</sub> Background Concentration (µg/m <sup>3</sup> ) 2012
Lady Margaret Road	UB	1.58 - northeast	Diffusion Tube	LB Islington	34.0
Tavistock Gardens	UB	2.15 - southeast	Diffusion Tube	LB Camden	40.2
Wakefield Gardens	UB	2.38 – southeast	Diffusion Tube	LB Camden	39.3

\* UB = Urban Background

- 3.25. Given the distance of the monitoring locations to the Site, the background NO<sub>2</sub> concentration from the Defra background maps was considered more representative of the local condition and was therefore used in this assessment, as provided in Table 6.

Table 6: Background Pollutant Concentrations used in the Assessment

Source	Pollutant	Annual Mean Background Concentration 2013 (µg/m <sup>3</sup> )
Defra Background Maps*	NO <sub>2</sub>	35.9

\* From the Defra Background Map grid square encompassing the Development (OS X,Y coordinates = 528500, 184500)

<sup>29</sup> <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>

#### Other Model Parameters

- 3.26. A number of other ADMS input parameters are described here for completeness and transparency:
- The model requires a surface roughness value to be inputted. A value of 1.5 was used, which is representative of large urban areas; and
  - The model requires the Monin-Obukhov length (a measure of the stability of the atmosphere) to be inputted. A value of 100m (representative of large conurbations) was used for the modelling.

#### Model Data Processing

- 3.27. The ADMS model was used to predict the contribution of heating plant emissions to overall NO<sub>2</sub> concentrations. This contribution was then added to background NO<sub>2</sub> concentration to determine the total NO<sub>2</sub> concentration at selected sensitive receptors.
- 3.28. Research undertaken<sup>30</sup> in support of Technical Guidance LAQM.TG(09) has indicated that the 1-hour mean AQS objective for NO<sub>2</sub> is unlikely to be exceeded at a roadside location where the annual mean NO<sub>2</sub> concentration is less than 60µg/m<sup>3</sup>. The 1-hour mean objective is, therefore, not considered further within this assessment where the annual mean NO<sub>2</sub> concentration is predicted to be less than 60µg/m<sup>3</sup>.

<sup>30</sup> AEAT, 2008, 'Analysis of the relationship between annual-mean nitrogen dioxide concentration and exceedances of the 1-hour mean AQS Objective'

## 4. Significance Criteria

### Construction

- 4.1. The assessment of construction effects was based on:
- Consideration of likely construction activities, and
  - A review of the sensitive uses in the area immediately surrounding the Site in relation to their distance and orientation.
- 4.2. The significance of effect was concluded through professional judgement based on the following:
- The baseline air quality conditions in the area surrounding the Site;
  - The mitigation measures that would be proposed; and
  - The knowledge of how such mitigation measures are routinely and successfully applied to construction projects throughout the UK.
- 4.3. In addition to the above, the classification system provided in Table 7 was adopted, again based on professional judgement, for the assessment of potential adverse air quality effects arising from dust generated by construction activities associated with the Development. Whether a construction site is considered to be minor or major is based on professional judgement on the basis of the size of the Site, size of the Development and duration of the construction works.

Table 7: Construction Significance Criteria

Effect Significance	Definition
Major adverse	Receptor is less than 10m from a major active construction site.
Moderate adverse	Receptor is 10m to 100m from a major active construction site, or up to 10m from a minor active construction site.
Minor adverse	Receptor is between 100m and 200m from a major active construction site or 10m to 100m from a minor active construction site.
Negligible	Receptor is over 100m from any minor active construction site or over 200m from any major active construction site.

### Completed Development

- 4.4. The magnitude and significance of effects of the Development on local air quality has been determined based on the criteria set out in the EPUK Guidance 'Development Control: Planning for Air Quality (2010 Update)'<sup>15</sup>.
- 4.5. Table 8 presents the magnitude of change descriptors, based on the change in concentration predicted to be brought about by additional emissions from the heating plant, as a percentage of the AQS objective (of 40µg/m<sup>3</sup> for annual mean NO<sub>2</sub>).
- 4.6. Table 9 presents the effect significance descriptors that take account of the magnitude of changes (both positive and negative) given in Table 8, and the concentration in relation to the AQS objective.

Table 8: Magnitude of Change Descriptor in Relation to Changes in Annual Mean NO<sub>2</sub>

Magnitude of Change	Changes in Pollutant Concentration Relative to the AQS Objective	Annual Mean NO <sub>2</sub>
Large	Increase/decrease > 10%	>4 µg/m <sup>3</sup>
Medium	Increase/decrease 5-10%	2-4 µg/m <sup>3</sup>
Small	Increase/decrease 1-5%	0.4-2 µg/m <sup>3</sup>
Imperceptible	Increase/decrease < 1%	<0.4 µg/m <sup>3</sup>

Table 9: Significance Criteria for Annual Mean NO<sub>2</sub>

Concentration in Relation to AQS Objective	Small	Medium	Large
<b>Decrease with Development</b>			
Above objective without development (>40µg/m <sup>3</sup> )	Minor beneficial	Moderate beneficial	Substantial beneficial
Just below without development (36-40µg/m <sup>3</sup> )	Minor beneficial	Moderate beneficial	Moderate beneficial
Below objective without development (30-36µg/m <sup>3</sup> )	Negligible	Minor beneficial	Minor beneficial
Well below objective without scheme (<30µg/m <sup>3</sup> )	Negligible	Negligible	Minor beneficial
<b>Increase with Development</b>			
Above objective with development (>40µg/m <sup>3</sup> )	Minor adverse	Moderate adverse	Substantial adverse
Just below with development (36-40µg/m <sup>3</sup> )	Minor adverse	Moderate adverse	Moderate adverse
Below objective with development (30-36µg/m <sup>3</sup> )	Negligible	Minor adverse	Minor adverse
Well below objective with scheme (<30µg/m <sup>3</sup> )	Negligible	Negligible	Minor adverse
An imperceptible change would be described as 'negligible'			

## 5. Baseline Air Quality

### London Borough of Camden Review and Assessment Process

- 5.1. Between 1998 and 2001 LBC undertook the first Round of Review and Assessment of air quality<sup>31</sup> which concluded that it was necessary to declare the whole Borough as an AQMA for the annual mean objective for NO<sub>2</sub> and the 24-hour mean objective for PM<sub>10</sub>.
- 5.2. The Updating and Screening Assessments (USAs) completed in August 2003<sup>32</sup>, 2006<sup>33</sup> and 2009<sup>34</sup> concluded that the LBC AQMA designation should remain and no further Detailed Assessment for air quality were required.
- 5.3. The fourth Round of Review and Assessment<sup>35</sup> identified that Camden no longer exceeded the 24-hour mean objective for PM<sub>10</sub> at three of their automatic monitoring sites. However, LBC attributed this to the change in the methodology used to measure PM<sub>10</sub> concentrations rather than improvements in emissions, and therefore, the AQMA order remained unchanged.
- 5.4. The fourth Round of Review and Assessment additionally indicated that a number of diffusion tube sites and one automatic site at roadside locations exceeded the 1-hour mean NO<sub>2</sub> AQS objective. LBC undertook further modelling work to understand the spatial distribution of PM<sub>10</sub> and NO<sub>2</sub> exceedances across the Borough. The modelling revealed that a number of roads in Camden, which experience high volumes of traffic and a large proportion of HGV vehicles, exceeded both short and long term NO<sub>2</sub> and PM<sub>10</sub> AQS objectives.
- 5.5. The latest air quality report published by LBC as part of the Fifth Round of Review and Assessment<sup>36</sup> confirmed that the NO<sub>2</sub> annual mean AQS objective was still exceeding at all the Council's automatic monitoring sites and the vast majority of the NO<sub>2</sub> diffusion tube sites. Although the report confirmed that PM<sub>10</sub> concentrations now meet the AQS objectives at all monitoring sites, no amendment to the AQMA order has been suggested.

### Local Monitoring

- 5.6. The Site lies within LBC's administrative area. However, there are no monitoring sites in the immediate vicinity of the Site. In particular, there are no monitoring sites on the two nearby busy roads, the A400 Kentish Town Road (which lies 40m east of the Site) and the A502 Hawley Road (immediately north of the Site). The best estimate for NO<sub>2</sub> concentrations on these roads would be the concentrations monitored along the A401 Shaftesbury Avenue in Camden, about 3.2km south of the Site. The NO<sub>2</sub> annual mean concentration at this monitoring site in 2012 was 71µg/m<sup>3</sup>, which is well above the objective of 40µg/m<sup>3</sup>. However, this is a roadside monitoring site, located 3m from the kerb. As the Development Site is located further away from the A400, NO<sub>2</sub> concentrations, which reduce quickly with distance from the kerb, are likely to be significantly lower around the Site.
- 5.7. Results from the 3 nearest monitoring sites (urban background locations within 2.5km of the Site) have been reported in Table 5. However, as discussed in Section 5 'Background Concentrations', it is considered that these background monitoring sites are not representative of ambient air quality levels in the vicinity of the Site, and that the Defra background maps are more suitable to determine the local air quality conditions (see Table 6).

<sup>31</sup> LBC, June 1998, 'Statutory Review and Assessment of Air Quality in the London Borough of Camden Stages 1 and 2'

<sup>32</sup> LBC, August 2003, 'Second Round of Review and Assessment of Air Quality: Updating and Screening Assessment'

<sup>33</sup> LBC, August 2006, 'Third Round of Review and Assessment of Air Quality: Updating and Screening Assessment'

<sup>34</sup> LBC, August 2009, '2009 Air Quality Updating and Screening Assessment for London Borough of Camden'

<sup>35</sup> LBC, June 2010, '2009 Progress Report for London Borough of Camden'

<sup>36</sup> LBC, July 2013, '2013 Air Quality Progress Report for the London Borough of Camden'



## 6. Construction Phase Effects

- 6.1. Given the size and nature of the Development it is considered to be a major construction site. In addition, based on its approximate size (2,680m<sup>2</sup>), the Site would be classed as a 'Medium' risk site (between 1,000m<sup>2</sup> and 15,000m<sup>2</sup> (0.1-1.5 hectares) of land) by the GLA 'Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance'<sup>19</sup>.
- 6.2. The construction works in relation to the Development have the potential to affect local air quality conditions, as follows:
- Dust generated from construction activities;
  - Emissions from construction plant e.g. piling rigs, compressors, excavators, concrete mixers and generators; and
  - Emissions from vehicles (e.g. lorries, cars and vans) associated with the construction of the Development, import of building materials and removal of waste materials, accessing and leaving the Site on the local road network.
- 6.3. All construction effects would be localised and temporary.

### Nuisance Dust

- 6.4. The National Air Quality Objectives seek to address the health implications of fine particulate matter, which comes largely from combustion sources such as motor vehicle engines. In the case of particles released from ground excavation works and construction, the majority of these would tend to be larger particles, which generally settle out close to the works and may cause annoyance due to their soiling capability. In this respect, there are no formal standards or criteria for adverse effects caused by deposited particulate matter.
- 6.5. Dust from construction materials generally does not arise at distances beyond approximately 200m from the works (in the absence of mitigation), and the majority of any deposition that might give rise to significant soiling tends to occur within 50m to 100m<sup>37</sup>. Receptors that are downwind of a construction site are at more risk of dust effects than those that are upwind. The occupiers of residential properties tend to be more sensitive to dust than occupiers of commercial properties. In addition, in built up areas, neighbouring buildings will limit the movement of dust by acting as a 'screen'.
- 6.6. The area surrounding the Site is predominantly occupied by residential uses, with a number of residential flats in the nearby building blocks. The nearest residential properties are 1 Hawley Road located to the east within 10m of the Site boundary and the proposed future residential buildings within the Camden Lock Village to the west and the south of the Site. Additionally, there are a number of residential properties located between 10m and 200m of the Site in all directions.
- 6.7. Given the proximity of residential properties to the Site, and based on criteria in Table 7, it is likely that without mitigation, there would be the potential for, at worst, temporary **major adverse** effects (during dry and windy conditions) from Site construction activities at the closest properties (within 10m) to the Site boundary, temporary **moderate adverse** effects at receptors between 10m and 100m from the Site and temporary **minor adverse** effects at receptors between 100m and 200m from the Site. As such, specific management controls, such as those set out in Section 8 'Mitigation Measures', would be required to reduce the potential for dust effects on these existing properties.

<sup>37</sup> Arup Environmental / Ove Arup and Partners, 1995, 'The Environmental Effects of Dust from Surface Mineral Workings'

### **Vehicle Emissions**

- 6.8. Operating plant within the Site and construction vehicles entering and leaving the Site would have the potential to contribute to local levels of air pollution, particularly NO<sub>2</sub> and PM<sub>10</sub> through exhaust emissions.
- 6.9. Although data relating to anticipated construction vehicle movements is not available at this stage, it is anticipated that the effect of construction vehicles entering and leaving the Site would be **negligible** in the context of local background pollutant concentrations and existing high local road traffic emissions.
- 6.10. Emissions from plant operating on the Site would be small in comparison to the emissions from the road traffic movements on the main roads adjacent to the Site and therefore would to have a **negligible** effect on air quality. The proposed mitigation measures (see Section 8) would further reduce potential effects.

## 7. Operational Phase Effects

### Nitrogen Dioxide (NO<sub>2</sub>)

- 7.1. The results of the detailed dispersion modelling of emissions from the proposed heating plant are presented in Table 10 below, for all sensitive receptors identified in this assessment. NO<sub>2</sub> background concentrations have been added to the modelled concentrations to determine the total NO<sub>2</sub> concentration at all sensitive receptors.

Table 10: Modelled NO<sub>2</sub> Concentrations at Sensitive Receptors

Receptor	NO <sub>2</sub> Annual Mean (µg/m <sup>3</sup> )
<b>Receptor R1: 6 Hawley Road</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R2: 174 Camden Street</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R3: 1A-1E Jefferys Street</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R4: 1-24 Bradfield Court, Torbay Street</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R5: 53-55 Camden Gardens</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R6: 22A Castlehaven Road</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R7: 1-84 Durban House</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R8: 236 Royal College Street</b>	
2013 Without Development	35.9
2013 With Development	35.9

Receptor	NO <sub>2</sub> Annual Mean (µg/m <sup>3</sup> )
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R9: 1-8 Ellen Terry Court, Farrier Street</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R10: 10 Chalk Farm Road</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R11: 1 Grand Union Way</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R12: 214-216 Camden High Street</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R13: 1 Hawley Road</b>	
2013 Without Development	35.9
2013 With Development	35.9
<b>2013 Change</b>	<b>0.0</b>
<b>Receptor R14: Camden Lock Village Building X 4<sup>th</sup> Floor</b>	
2013 Without Development	35.9
2013 With Development	36.5
<b>2013 Change</b>	<b>0.6</b>
<b>Receptor R15: Camden Lock Village Building W 4<sup>th</sup> Floor</b>	
2013 Without Development	35.9
2013 With Development	36.1
<b>2013 Change</b>	<b>0.2</b>
<b>Receptor R16: Outdoor Classroom *</b>	
2013 With Development	36.0
* Proposed on-site Receptor	

#### Concentrations at Existing Sensitive Receptors

- 7.2. As shown in Table 10, the maximum predicted annual mean NO<sub>2</sub> concentration in 2013 at sensitive receptors is 36.5µg/m<sup>3</sup> 'with' the Development at Receptor 14, representative of the proposed residential units part of the Camden Lock Village development (Building X at 4<sup>th</sup> floor level). This concentration is below the AQS objective of 40µg/m<sup>3</sup>. Concentrations at all other modelled sensitive receptors are also below the annual mean NO<sub>2</sub> AQS objective with or without the Development.

- 7.3. The greatest contribution to annual mean NO<sub>2</sub>, 'with' the proposed heating plant is +0.6µg/m<sup>3</sup> at Receptor 14. Using the magnitude of change descriptors outlined in Table 8, the Development is predicted to result in a 'small' change (i.e. changes of 0.4-2µg/m<sup>3</sup> annual mean NO<sub>2</sub>) at this receptor, and an 'imperceptible' change (i.e. changes of <0.4µg/m<sup>3</sup> annual mean NO<sub>2</sub>) at all other sensitive receptors considered. On the basis of the significance of effect criteria outlined in Table 9, a **minor adverse** effect on annual mean NO<sub>2</sub> is predicted at Receptor 14, and a **negligible** effect predicted at all other sensitive receptors considered, as a result of the operation of the proposed heating plant.
- 7.4. As discussed in Section 3 'Assessment Methodology', given that the maximum predicted annual mean NO<sub>2</sub> concentration is below 60µg/m<sup>3</sup>, it is considered that the 1-hour objective is predicted to be met at all sensitive receptors. Given this, it is considered that the Development would also have a **negligible** effect on 1-hour mean NO<sub>2</sub> concentrations.

#### Concentrations within the Proposed Development

- 7.5. Within the Development itself concentrations are predicted to meet the NO<sub>2</sub> annual mean AQS objective of 40µg/m<sup>3</sup> (Receptor R16 representative of the outdoor classroom on the roof terrace). The maximum contribution of heating plant emissions to overall NO<sub>2</sub> concentrations is predicted to be +0.1µg/m<sup>3</sup> at receptor R16, which is considered "imperceptible" as per the criteria in Table 8.
- 7.6. It is therefore considered that the effect of the stack emissions on sensitive receptors within the Site would be **negligible**.

## 8. Mitigation Measures

### Construction Phase

- 8.1. This section presents the mitigation measures that should be implemented onsite, based on the findings of the 'Construction Phase Effects' section.

#### Nuisance Dust

- 8.2. A range of environmental management controls would be developed with reference to the Building Research Establishment guidance 'Controlling Particles, Vapour and Noise from Construction Sites'<sup>38</sup>, the GLA 'Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance'<sup>19</sup>, relating to 'Medium' risk sites and the London Borough of Camden Guide for Contractors Working in Camden<sup>23</sup>. Such measures would prevent the release of dust entering the atmosphere and/or being deposited on nearby receptors. The measures would include:
- Routine dust monitoring at sensitive residential locations with the results and effectiveness of controls reviewed at regular meetings;
  - Damping down surfaces during dry windy weather;
  - Direction of appropriate hoarding and/or fencing to reduce dust dispersion and restrict public access, and sheeting of chutes, skips and vehicles removing construction wastes;
  - Appropriate handling and storage of materials;
  - Loading and unloading would only be permitted in designated areas;
  - Effective vehicle washing facilities will be provided for vehicles leaving the Site;
  - Fitting all equipment (e.g. for cutting, grinding, crushing) with dust control measures such as water sprays wherever possible;
  - Prevention of dust-contaminated run-off water from the Site;
  - Use of low emission alternative fuelled plant where feasible, and ensuring that all plant and vehicles are well maintained so that exhaust emissions do not breach statutory emission limits;
  - Switching off of all plant when not in use;
  - Effectively screening dusty activities, such as stone cutting and grinding;
  - Banning fires on the Site;
  - Ensuring that cleaning equipment is available to clean mud from hard standing roads and footpaths; and
  - Close liaison with surrounding sensitive properties during periods that may generate dust as a result of the combination of activities and particular wind conditions (speed and direction).
- 8.3. Such measures are routinely and successfully applied to construction projects throughout the UK and are capable of significantly reducing the potential for adverse nuisance dust effects associated with the various stages of construction work. Therefore, the residual dust effects associated with construction activities are considered to be at worst temporary **moderate adverse** at properties within 10m of the Site boundary, temporary **minor adverse** at properties between 10m and 100m from the Site boundary and **negligible** elsewhere.

<sup>38</sup> Building Research Establishment (BRE), 2003, 'Controlling particles, vapour and noise from pollution from construction sites'

#### Vehicle Emissions

- 8.4. Detailed mitigation measures to control construction traffic would be discussed and agreed with LBC to establish the most suitable access and haul routes for Site traffic. The most effective mitigation would be achieved by ensuring that construction traffic does not pass along sensitive roads (residential roads, congested roads, via unsuitable junctions, etc.) where possible. The timing of large-scale vehicle movements to avoid peak hours on the local road network would also be beneficial.
- 8.5. The likely residual effects of plant operating on the Site would be **negligible** in the context of local background concentrations or existing adjacent road traffic emissions. The residual effects of construction vehicles entering and leaving the Site would be **negligible**.

#### Operational Phase

- 8.6. As discussed in Section 7 'Operational Phase Effects', the Development would have a negligible effect on nearby existing sensitive receptors and therefore mitigation measures are not required. However, as a minor adverse effect is predicted for the nearby proposed residential unit (Receptor 14 – Building X at 4<sup>th</sup> floor level), part of the Camden Lock Village development, mitigation measures would be necessary to minimise the risk of exposure for future occupiers. Given that the increase in air pollution is predicted to be small, measures could include small alterations of the design for the residential unit on the 4<sup>th</sup> floor to reduce potential exposure.

## 9. Summary and Conclusions

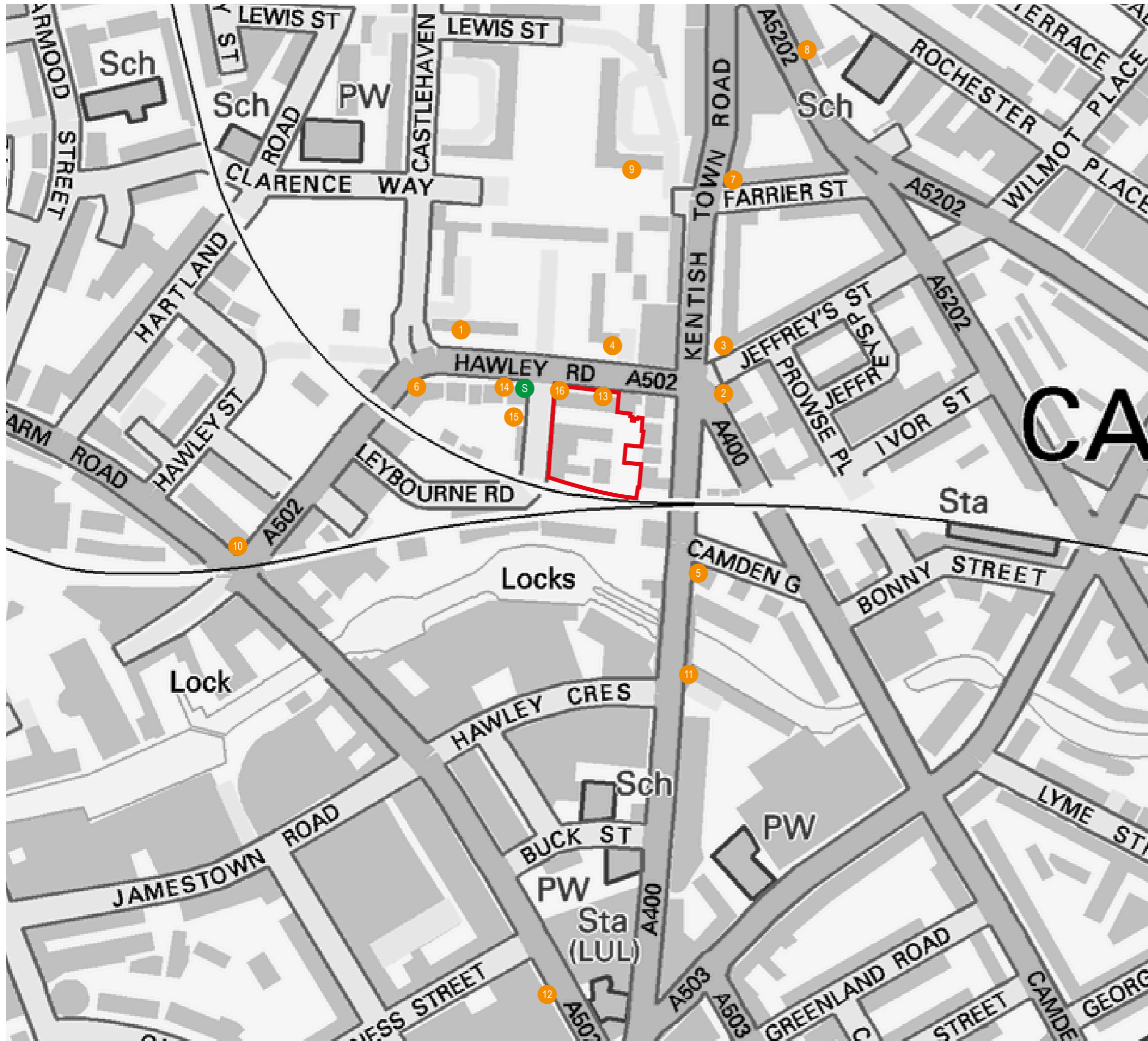
- 9.1. A qualitative assessment of dust effects during the construction phase has been carried out. With the implementation of a range of appropriate site management practices to control dust emissions, effects associated with construction activities are considered to be **negligible** to, at worst, temporary **moderate adverse**.
- 9.2. Any emissions from plant operating on the Site would be small in comparison to the emissions from the road traffic movements on the roads adjacent to the Site and would therefore be **negligible**.
- 9.3. It is anticipated that the effect of construction vehicles entering and leaving the Site would be **negligible** in the context of local background pollutant concentrations and existing local road traffic emissions.
- 9.4. All demolition and construction effects would be localised and temporary.
- 9.5. A quantitative assessment of effects from the proposed heating plant emissions has been carried out, based on detailed atmospheric dispersion modelling of pollutant emissions. Pollutant concentrations at nearby existing and proposed new residential properties have been predicted using the ADMS dispersion model, using background concentrations for the year 2013 as a worst-case assumption.
- 9.6. The proposed heating plant is predicted to have a **negligible** effect on air quality at all existing receptors considered. However, a **minor adverse** effect is predicted at one of the proposed residential units part of the Camden Lock Village development, at 4<sup>th</sup> floor level. Specific mitigation measures would be required for this unit to ensure the risk of exposure is minimised for future occupiers.





## Figures

## **Figure 1: Modelled Air Quality Sensitive Receptors and Stack Location**



- Site Boundary
- Sensitive Receptor Locations
- 1 6 Hawley Road
- 2 174 Camden Street
- 3 1A-1E Jefferys Street
- 4 1-24 Bradfield Court, Torbay Street
- 5 53-55 Camden Gardens
- 6 22A Castlehaven Road
- 7 1-84 Durban House
- 8 236 Royal College Street
- 9 1-8 Ellen Terry Court, Farrier Street
- 10 10 Chalk Farm Road
- 11 1 Grand Union Way
- 12 214-216 Camden High Street
- 13 1 Hawley Road
- 14 Building X Camden Lock Village (Floor 4)
- 15 Building W Camden Lock Village
- 16 Outdoor Classroom
- S Stack Location

Project Details EED14474-100: Hawley Primary School

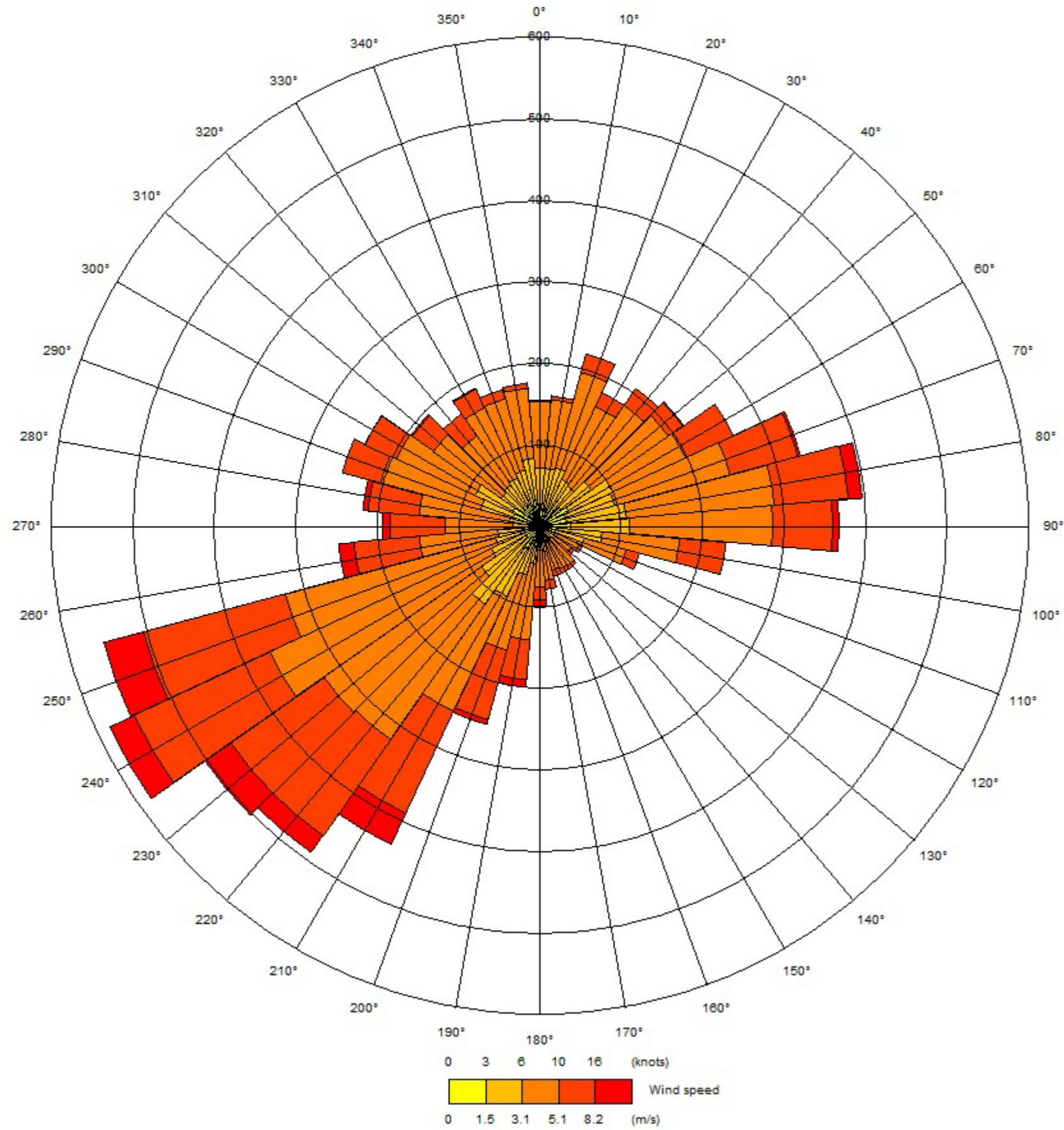
Figure Title Figure 1: Modelled Air Quality Sensitive Receptors and Stack Locations

Figure Ref EED14474-100\_GR\_AQ\_1A

Date March 2014

File Location \\nt-incs\weed\projects\eed14474\100\graphics\laq\issued figures

## **Figure 2: Wind Rose of the London City Airport 2013 Meteorological Data**



Project Details	EED14474-100: Hawley Primary School
Figure Title	Figure 2: Wind Rose of the London City Airport 2013 Meteorological Data
Figure Ref	EED14474-100_GR_AQ_2A
Date	March 2014
File Location	\\nt-lncs\weed\projects\leed14474\100\graphics\aq\issued figures

### **Figure 3: CHP and Boiler Load Profile**

























# UK and Ireland Office Locations

