

8 AIR QUALITY

Introduction

- 8.1 This chapter of the ES presents an assessment of the potential impacts and associated likely effects of the proposed development (arising from both the demolition and construction works, and occupation of the completed development). The assessment includes a review of existing air quality. Potential sources of emissions are identified and assessed in the context of existing air quality and emission sources and the nature and location of receptors. An assessment of site suitability for the intended use has also been undertaken.
- 8.2 This chapter is accompanied by the following technical appendices:
- Technical Appendix 8.1: IAQM Dust Criteria;
 - Technical Appendix 8.2: APEC Categories;
 - Technical Appendix 8.3: PM₁₀ Monitoring Summary;
 - Technical Appendix 8.4: Site Odour Diary;
 - Technical Appendix 8.5: Traffic Data; and
 - Technical Appendix 8.6: Verification Calculations.

Legislation and Policy Context

International Legislation and Policy

The European Air Quality Directives 2008/50/EC and 2004/107/EC

- 8.3 The European Air Quality Directive 2008/50/EC¹ on ambient air quality and cleaner air for Europe (CAFE) establishes a strategic framework for setting European-wide limit and/or target values for seven pollutants (nitrogen oxides, particulate matter, sulphur dioxide, ozone, carbon monoxide, lead and benzene). Limit values for heavy metals and polycyclic aromatic hydrocarbons are established by the Fourth-Daughter Directive 2004/107/EC² and are based on recommendations made by the World Health Organisation (WHO).
- 8.4 These directives have been transposed into UK legislation and implemented in England by the Air Quality Standards Regulations 2010. Overall responsibility for achieving the limits lies with the Secretary of State; however, local authorities have a role through their duties to work towards meeting the national air quality objectives which are similar, or in some cases, more stringent than the EU limit values.

¹ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. European Commission. 2008

² European Air Quality Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. European Commission. 2004

National Legislation and Policy

Air Quality Strategy for England, Scotland, Wales and Northern Ireland

- 8.5 The Government's policy on air quality within the United Kingdom (UK) is set out in the Air Quality Strategy (AQS), most recently updated in July 2007³. The AQS sets out a framework for reducing hazards to health from air pollution and to ensure that the European Union and International agreements are met in the UK.
- 8.6 The AQS sets standards and objectives for the ten listed pollutants. These are ammonia, benzene, 1, 3 butadiene, carbon monoxide, lead, oxides of nitrogen (NO_x) (including NO₂), particulate matter (PM₁₀ and PM_{2.5}), sulphur dioxide, ozone, and polycyclic aromatic hydrocarbons.
- 8.7 Standards are the concentrations of these pollutants in the atmosphere which can broadly be taken to achieve an acceptable level of environmental quality. The standards are based on the assessment of the effects on human health (including sensitive sub-groups) or ecosystems. In general these are concentration limits above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects. Objectives are policy targets often expressed as maximum concentrations not to be exceeded either without exception or with a limited number of exceedances within a specified timescale.
- 8.8 For some pollutants, there is both a long-term (e.g. annual mean) standard and a short-term (e.g. one hour mean) standard, to reflect the varying impacts on health of differing exposures to pollutants. Long-term standards are generally lower than short-term standards owing to the chronic health effects associated with exposure to low concentrations of pollutants for longer periods of time.

Air Quality (England) Regulations

- 8.9 Many of the objectives in the AQS were made statutory in England with the Air Quality (England) Regulations 2000⁴ and the Air Quality (England) (Amendment) Regulations 2002⁵ for the purpose of Local Air Quality Management (LAQM). Draft Air Quality (England) Regulations 2015⁶ currently out for consultation propose to reduce the number of pollutants with air quality objective levels from seven to three (NO₂, PM₁₀ and SO₂), albeit there are changes to the NO₂ and PM₁₀ objectives. The following objectives for NO₂ and PM₁₀ which are relevant to this assessment are as follows:
- 8.10 For NO₂:
- 40 micrograms per cubic metre (µg/m³) or less, when expressed as an annual mean; and
 - 200 µg/m³, when expressed as an hourly mean, not to be exceeded more than 18 times a year.
- 8.11 For PM₁₀:
- 40 µg/m³ or less, when expressed as an annual mean; and
 - 50 µg/m³ or less, when expressed as a 24 hour mean, not to be exceeded more than 35 times a year.

³ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. DEFRA. July 2007

⁴ The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928

⁵ The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043

⁶ The Air Quality (England) Regulations 2015 - Draft

- 8.12 Objectives included in the Air Quality (England) Regulations are generally more stringent than those included within EU legislation and other English regulations. Therefore, throughout this report, reference to statutory standards or objectives means those included within the Air Quality (England) Regulations.
- 8.13 The objectives apply at locations where members of the public would be exposed over the relevant exposure period. For example, the annual mean objective applies at the building façades of residential properties and public buildings. The objectives do not apply in gardens of residential properties, at the building façades of offices (or other places of work), or at kerbside locations where public exposure would be short term. The one hour mean objective would apply at any outdoor location where members of the public might reasonably be expected to spend an hour or longer.

National Planning Policy Framework, 2012

- 8.14 The National Planning Policy Framework (NPPF)⁷ set out the Government's planning policies for England and how these are expected to be applied.
- 8.15 The NPPF advises that the planning system should prevent both new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of air pollution.

National Planning Practice Guidance

- 8.16 The Government published Planning Practice Guidance for England⁸ on 6th March 2014 which has a section on air quality that outlines its role in the planning process and states how detailed air quality assessments need to be undertaken. This guidance has been taken into account whilst undertaking the assessment.

Local Air Quality Management (LAQM) Technical Guidance

- 8.17 Part IV of the Environment Act 1995⁹, requires the UK Government to publish an Air Quality Strategy and local authorities to review, assess and manage air quality within their areas. This is known as Local Air Quality Management (LAQM). Where a local authority's review and assessment of its air quality identifies that air quality is likely to exceed the National Air Quality Objectives (NAQOs), it must designate these areas as Air Quality Management Areas (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out measures to reduce pollutant concentrations with the aim of meeting the NAQOs. The most recent version of the LAQM guidance was published in April 2016 (TG 16)¹⁰.

Regional Policy

Minor Alterations to the London Plan, 2016

- 8.18 The London Plan¹¹ is the overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. On 10th March 2015, the Mayor adopted the Further Alterations to the London Plan (FALP)¹². From this date, the FALP are operative as formal alterations to the London Plan (the Mayor's spatial development strategy) and form part of the development plan for Greater London. In addition to this, minor

alterations to the FALP (MALP¹³) were adopted in March 2016 which amended some of the policies in relation to air quality, in particular policy 7.14.

- 8.19 Planning policy in respect of development and air quality is presented in the London Plan's Policy 7.14:

Policy 7.14 Improving Air Quality

- Minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMA) 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;
- 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';
- 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 (AQMA));
- 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; and
- 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.

- 8.20 Planning Policy for Smoothing Traffic Flow and Traffic Congestions is in the London Plan Policy 6.11:

Policy 6.11 Smoothing Traffic Flow and Tackling Congestion

- 8.21 Through the Local Development Framework and Development Plan Documents (DPDs) the following measures should be included for all Boroughs in London and therefore (where applicable) should apply/be implemented as part of the proposed development:
- Promoting local services and e-services to reduce the need to travel;
 - Improving the extent and quality of pedestrian and cycling routes;
 - Making greater use of the Blue Ribbon Network;
 - Improving the extent and quality of public transport;
 - Developing intelligent transport systems to convey information to transport users;
 - Developing integrated and comprehensive travel planning advice;
 - Promoting and encouraging car sharing and car clubs;
 - Smoothing traffic flow to improve journey time reliability;
 - Applying the London street-types framework to ensure that the needs of street users and improvements to the public realm are dealt with in a coordinated way; and
 - Promoting efficient and sustainable arrangements for the transportation and delivery of freight.

- 8.22 Planning policy in respect of sustainable design and construction is presented in the London Plan's Policy 5.3:

⁷ The National Planning Policy Framework, Department for Communities and Local Government, March 2012

⁸ UK Government, Department for Communities and Local Government.2014. *Planning Practice Guidance* [online] [Date Accessed May 2016] Available from: <http://planningguidance.planningportal.gov.uk/>

⁹ Secretary of State, 1995. The Environment Act part IV Air Quality, HMSO.

¹⁰ DEFRA, 2016. Local Air Quality Management Technical Guidance (TG16), DEFRA.

¹¹ The London Plan July 2011. [Online] <https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan> Mayor of London

¹² The London Plan (FALP). Further Alterations to the London Plan. <https://www.london.gov.uk/what-we-do/planning/london-plan/minor-alterations-london-plan> Mayor of London. March 2015

¹³ The London Plan (MALP). Minor Alterations to the Further Alterations to the London Plan <http://www.london.gov.uk/what-we-do/planning/london-plan/minor-alterations-london-plan/minor-alterations-london-plan-2015>. March 2016

Policy 5.3 Sustainable Design and Construction

- Strategic: The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.
- Planning decisions: Development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process. Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:
 - Minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems);
 - Avoiding internal overheating and contributing to the urban heat island effect;
 - Efficient use of natural resources (including water), including making the most of natural systems both within and around buildings;
 - Minimising pollution (including noise, air and urban runoff);
 - Minimising the generation of waste and maximising reuse or recycling;
 - Avoiding impacts from natural hazards (including flooding);
 - Ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions;
 - Securing sustainable procurement of materials, using local supplies where feasible; and
 - Promoting and protecting biodiversity and green infrastructure.

Clearing the Air – The Mayor's Air Quality Strategy, 2010

- 8.23 The Mayor's Air Quality Strategy¹⁴ identifies road traffic as the largest contributor to air pollution within London. It also aims to implement the Construction Best Practice Guidance on all construction sites across London and use planning policy to improve air quality.
- 8.24 Regarding new developments, the Strategy plans to make use of the existing planning system to ensure that no new development has a negative impact on air quality in London.

Policy 6 – Reducing Emissions from Construction and Demolition Sites

- Vision: Responsibly managed construction and demolition sites that pose no health risk to people working or living nearby.
- Policy: The Mayor will work with London boroughs, the GLA group and the construction industry to encourage implementation of the Best Practice Guidance for construction and demolition sites across London.
- Proposals: The Mayor will work with London Councils to review and update the Best Practice Guidance (BPG) for construction and demolition sites and then create Supplementary Planning Guidance to assist implementation. The Mayor will ensure that strategic planning applications include BPG implementation. The Mayor will require the Greater London Authority Group to include full implementation of the BPG in its procurement policy (including through the supply chain).

¹⁴ Clearing the Air: The Mayor's Air Quality Strategy. Greater London Authority. 2010

Local Policy

Royal Greenwich Local Plan: Core Strategy, 2014

- 8.25 The 2014 Royal Greenwich Local Plan Core Strategy¹⁵ will help to guide the decisions about developments which will take place up until 2028. Within the Core Strategy Policy E(c) Air Pollution, discusses air quality and how it will be taken into account and is detailed below:

Policy E(c) Air Pollution

Development proposals with the potential to result in any significant impact on air quality will be resisted unless measures to minimise the impact of air pollutants are included. Such planning applications should be accompanied by an assessment of the likely impact of the development on air quality.

All new development with a floor space of greater than 500sqm or residential developments of 10 or more units are required to reduce carbon dioxide (CO₂) particulate matter (PM₁₀) and nitrogen dioxide (NO₂) and should take into account the need to reduce exposure by the following mitigation hierarchy:

- i. Separation by distance;
- ii. External layout;
- iii. Internal layout; and
- iv. Suitable ventilation.

Charlton Riverside Masterplan, 2012

- 8.26 The Charlton Riverside Masterplan Supplementary Planning Document¹⁶ (SPD) is a strategic plan to guide development of the area over the next 15-20 years. The Charlton Riverside has been identified as an Opportunity Area in the London Plan, and has been identified for mixed use development with significant capacity for jobs and new homes. Within the document one of the detailed objectives includes the "creation of a better environment for all uses".

Royal Greenwich Codes of Practice for Construction Firms

- 8.27 Royal Borough of Greenwich (RBG) has published a number of Codes of Practice for construction firms. Most of these are associated with noise; however the "Code of Practice for Small Scale Building Sites"¹⁷ includes some dust mitigation measures which should still be applicable to the proposed development, even though it would not be classed as a small scale development.

Royal Greenwich, Air Quality Action Plan, 2014 and AQAP Draft for Consultation 2016

- 8.28 In 2014, RBG updated their air quality action plan¹⁸ as part of the 2014 Air Quality Progress report. This report comments on the implementation of the original Air Quality Action Plan and the progress which has been made since its publication. The majority of the actions which were proposed in the original action plan are still on-going and continuing to improve air quality in the Borough.

¹⁵ Royal Greenwich. Royal Greenwich Local Plan: Core Strategy with Detail Policies, 2014

¹⁶ Allies and Morrison Urban Practitioners and Royal Greenwich. Charlton Riverside Masterplan SPD, 2012

¹⁷ Royal Greenwich. 2015. *Code of Practice for Small Scale Building Sites*. [ONLINE] Available at: http://www.royalgreenwich.gov.uk/downloads/download/188/codes_of_practice_for_construction_firms. [Accessed 29 September 2016].

¹⁸ Royal Greenwich. 2014 Air Quality Progress Report for Royal Borough of Greenwich. London: 2014

8.29 In July 2016, a draft consultation began for the latest air quality action plan (AQAP)¹⁹. The plan outlines the actions which the RBG plans to undertake in order to improve the air quality between 2016 and 2020. The AQAP outlines how RBG plans to effectively use local levers to tackle air quality issues within their control. Within the draft consultation the AQAP has developed actions that can be considered within six broad topics:

- Emissions from developments and building;
- Public health and awareness raising;
- Delivery servicing and freight;
- Borough fleet actions;
- Localised solutions; and
- Cleaner transport.

Other Guidance

Sustainable Design and Construction Supplementary Planning Guidance, 2014

8.30 In 2014 the Greater London Authority (GLA) published guidance²⁰ on the implementation of London Plan Policy 5.3 - Sustainable Design and Construction, as well as a range of policies, primarily in Chapters 5 and 7 that deal with matters relating to environmental sustainability.

8.31 The Mayor's priorities concerning air quality are outlined below:

- i. Developers are to design their schemes so that they are at least 'air quality neutral' (Policy 7.14);
- ii. Developments should be designed to minimise the generation of air pollution (Policies 5.3 and 7.14);
- iii. Developments should be designed to minimise and mitigate against increased exposure to poor air quality (Policies 3.2, 5.3 and 7.14);
- iv. Developers should select plant that meets the standards for emissions from combined heat and power and biomass plants (Policy 7.14); and
- v. Developers and contractors should follow the guidance set out in the emerging The Control of Dust and Emissions during Construction and Demolition SPG when constructing their development (Policies 5.3 and 7.14).

The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance, 2014

8.32 The GLA has published Supplementary Planning Guidance²¹ which incorporates the IAQM guidance¹⁵ on assessing impacts, details mitigation measures specific to London demolition and construction sites, and, includes specific emission standards for non-road mobile machinery (NRMM) from 2015 onwards.

Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction

8.33 The IAQM Guidance²² describes risk factors which affect the potential for dust to be created and released from the application site during construction activities and to migrate to, and be deposited on surfaces and cause nuisance. These factors are as follows:

1. The nature, scale and duration of activities;
2. Dust control measures employed;
3. The local climate and meteorology; and
4. The character and land use of the surrounding area.

8.34 These factors have been taken into account when undertaking the dust assessment. The IAQM dust criteria and risk matrices that have been used to determine dust impacts are reproduced in Technical Appendix 8.1 contained within Volume 3 of this ES.

Land-Use Planning & Development Control: Planning for Air Quality

8.35 There are no official guidelines for quantifying the degrees of significance associated with changes in local air quality arising from development proposals. The Land-Use Planning & Development Control: Planning For Air Quality Document was published in April 2015 and this guidance has been used, where appropriate within this assessment.

8.36 Significant descriptors from this document have been applied where necessary to allow a degree of quantification of the magnitude of change. The impact refers to the change that is predicted to take place to the air quality as a result of the proposed development compared to the predicted air quality without the development.

London Council's Air Quality and Planning Guidance

8.37 The London Councils' Air Quality & Planning Guidance²³ provides technical advice on how to deal with planning applications that could have an impact on air quality. An Air Pollution Exposure Criteria (APEC) is set out in this document to help local authorities assess the significance of exposure to air pollution and the levels of mitigation required for new developments. These criteria will be used to assess site suitability. The APEC table is reproduced in Appendix 8.2 contained within Volume 3 of this ES.

Consultation Feedback

8.38 As discussed in Chapter 2: EIA Process and Methodology, consideration has been given in this assessment to the EIA Scoping feedback comments provided by the RBG and consultees in respect of the proposed development. These key considerations are summarised in Table 8.1.

¹⁹ Royal Greenwich. 2015. *AQAP Draft for Consultation*. [ONLINE] Available at: https://consultations.royalgreenwich.gov.uk/UploadedFiles/160719_AQAP%20consultation%20Final.pdf

²⁰ Greater London Authority. Sustainable Design and Construction – SPG, Greater London Authority, 2014

²¹ Greater London Authority. The Control of Dust and Emissions During Construction and Demolition SPG. London : Mayor of London, 2014

²² Institute of Air Quality Management. Guidance on the assessment of dust from demolition and construction v1.1. 2016

²³ London Councils. Air Quality and Planning Guidance. 2007.

Table 8.1: Consultation Feedback

Consultee	Comment	Where in the Chapter this issue is addressed
<p>Nick Marks – Team Manager – Environmental Protection – Royal Borough of Greenwich Scoping Response (24th June 2016)</p>	<p>Particulate Matter</p> <p>Baseline information is limited in the area and as there are numerous Environment Agency licenced waste sites there is probably high levels of particulate matter.</p> <p>Odour</p> <p>Complaints relating to odour in the area (food flavouring firm, metal foundries) are in the vicinity of the development site.</p>	<p>Particulate Matter</p> <p>Particulate matter monitoring has been undertaken to establish current baselines levels within the site.</p> <p>Odour</p> <p>Requested information (via email 6/10/16 and 01.11.2016 and via telephone 10/10/16 and 27/10/16) regarding odour complaints to undertake an odour assessment. An email response was received 01/11/16, however, no specific data was provided to demonstrate the extent of any odour issue in the local area. An odour diary has been produced and reported upon within this chapter.</p>

Assessment Methodology

8.39 The key issues relating to air quality that have been considered in this assessment are:

- Short term/temporary impacts of demolition and construction dust on the area surrounding the application site;
- The potential impact of the local air quality on the newly introduced sensitive receptors on the application site; and
- Impacts of the proposed development on the local air quality, in terms of demolition and construction, and operational traffic emissions and emissions from the energy centre.

8.40 The demolition and construction impacts for the proposed development have been assessed qualitatively utilising IAQM Guidance²² and the GLA SPG²¹, a summary of the criteria can be seen in Technical Appendix 8.1 contained within Volume 3 of this ES.

8.41 The roads (traffic) and stack (energy centre and car park ventilation) assessments methodology follows the guidance provided by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) for the completion of air quality assessments for planning applications. The assessment has been carried out in a number of stages:

- Determination of the existing air quality pollutant concentrations in the vicinity of the application site utilising a number of sources of baseline data;
- Assessment of the impacts of the proposed development on local air quality using dispersion modelling of traffic and energy centre and car park emissions;
- Assessment of the potential impact of the local air quality on the newly introduced sensitive receptors by a review of air quality data, a qualitative assessment of nearby sources of emissions to air and by dispersion modelling of traffic and stack emissions;
- Calculation of the air pollutant concentrations with and without the proposed development completed and operations to determine the significance of any potential air quality impacts of existing sensitive receptors; and
- Determination if any mitigation measures to reduce air quality impacts are required.

Baseline Characterisation

8.42 As part of the baseline assessment for the proposed development, RBG was consulted and concerns were raised with respect to both odour and particulate matter arising from the existing land uses surrounding the proposed development. As a result it was determined that PM₁₀ baseline monitoring should be undertaken within the area to determine current PM₁₀ concentrations. Consequently, three months of baseline monitoring has been undertaken. The monitoring was undertaken utilising Turnkey Osiris Automatic monitors at two locations on the proposed development, and was commenced on 26th July 2016. The results of the baseline monitoring are included in Appendix 8.3 contained within Volume 3 of this ES.

8.43 Part A Processes are large scale industrial processes that are regulated by permits issued by the Environmental Agency. Part B Processes are smaller scale industrial processes that are regulated by permits issued by the Local Authority. There are no Part A processes close enough to the proposed development to cause concern, however there are some Part B processes including the adjacent Stone Foundries for Ferrous and Non-Ferrous Metal Processing. These processes have been taken into account when assessing site suitability. Figure 8.1 shows nearby Environment Agency and RBG authorised processes in the vicinity of the application site.



Figure 8.1: Part A and Part B Processes in the Vicinity of the Proposed Development

8.44 With respect to odour, the RBG has stated the following:

"There have been a number of complaints of odour from people using buildings on the edge of the Charlton Riverside area. There are a number of sites in that area which use solvents but not to a level that would require a formal Environmental Permit from the Council. In addition there are a number of potentially odorous processes including a food flavouring firm and three metal foundries which could be an issue."

8.45 In terms of odour, the RBG advised that the odour complaints had been from other parts of the area, and determined that odour monitoring wasn't appropriate. Therefore, it was agreed that a number of

site visits would be undertaken and any odours would be recorded in an odour diary, should any be identified during the visits. This information is provided in Appendix 8.4 contained within Volume 3 of this ES.

Method of Assessment

Scope of the Assessment

8.46 The scope of the assessment has been determined by consideration of the following:

- Consultation with the RBG's Environmental Health Department;
- A review of the local air quality data surrounding the application site, including project monitoring data, data from RBG and the UK-AIR: Air Information Resource by DEFRA; and
- A review of traffic and energy plant data for the proposed development.

8.47 The assessment has included the following scope of work:

- Baseline PM₁₀ monitoring on the proposed development to take into account the existing surrounding land uses;
- A qualitative assessment of the dust impacts during the construction and demolition periods on site;
- Computerised dispersion modelling to assess the potential impacts as a result of traffic generated from the site (both during the peak construction period and when the application site is occupied and operational);
- Computerised dispersion modelling to assess the potential impacts from the centralised energy plant which is proposed on the development; and
- Review current air quality to determine the suitability of the proposed site for residential use.

8.48 The modelling results of the energy centre emissions, car park emissions and operational traffic emissions have been combined to assess the impact for each sensitive receptor.

8.49 The assessment of existing baseline conditions has been undertaken utilising the following sources of information:

- RBG website²⁴ and LAQM air quality reports¹⁸;
- DEFRA Background Mapping data for local authorities website 2013²⁵;
- Project specific particulate matter monitoring;
- Transport Assessment for the application site; and
- Environment Agency website²⁶.

Demolition and Construction Impacts

8.50 An assessment of the impacts of dust emissions during construction has been undertaken by considering relevant guidance^{21, 22} and the availability and applicability of dust control measures.

8.51 The guidance describes the factors which affect the potential for dust to be created and released from the application site during construction activities and to migrate to, and be deposited on surfaces and cause nuisance. These factors are as follows:

- The nature, scale and duration of activities;
- Dust control measures employed;

- The local climate and meteorology; and
- The character and land use of the surrounding area.

8.52 The IAQM Guidance follows a stepped approach where, once it is determined that a detailed assessment is required due to the presence of sensitive receptors within 350m of the construction boundary (Step 1), the risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts is determined, based on two factors: the scale and nature of the works, which determines the potential Dust Emission Magnitude (DEM) as small, medium or large (Step 2A); and the sensitivity of the area to dust impacts (Step 2B), which is defined as low, medium or high sensitivity. These two factors are combined in Step 2C to determine the risk of dust impacts with no mitigation applied. Depending on the level of risk, specific dust mitigations measures are then considered, if necessary, and any residual impacts are then presented.

8.53 In line with IAQM Guidance the study area considered in the assessment of demolition and construction dust impacts has been determined to be areas within 350m of groundworks within the application site boundary. The extent of this boundary and buffers used to determine risk are presented in Figure 8.2 below.



Figure 8.2 Dust Buffer Boundaries

8.54 For the demolition and construction assessment, a peak construction traffic assessment has also been undertaken using the air quality dispersion model ADMS Roads²⁷ which is limited to roads where existing sensitive receptors are present in the vicinity of the application site. The traffic data for the assessment have been provided by Transport Planning Practice Limited and is summarised in Technical Appendix 8.5 contained within Volume 3 of this ES.

8.55 Demolition and construction plant emissions from Non Road Mobile machinery (NRMM) have not been modelled, as these are considered to be a temporary emission source. London Guidance²⁰ however

²⁷ CERC Ltd. ADMS-Roads Version 4.0.1.0. <http://www.cerc.co.uk/environmental-software/ADMS-Roads-model.html>

²⁴ RBG Air Quality Website. http://www.royalgreenwich.gov.uk/info/413/pollution_control_-_air_quality/580/air_quality [sourced October 2016]

²⁵ DEFRA Background Mapping data for local authorities 2013 website. <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013> [sourced October 2016]

²⁶ Environment Agency Website. www.environment-agency.gov.uk [sourced October 2016]

does state that from the 1st September 2015, NRMM of net power between 27kW and 560kW used in London will be required to meet certain emission standards. Construction plant associated with the demolition and construction phases will be compliant with this standard.

- 8.56 The following standard best practice construction control measures will be applied at the application site, and are therefore considered when determining the potential demolition and construction effects:
- Implement a stakeholder communication plan.
 - Display name and contact details of responsible person for dust issues on site boundary in addition to head/regional office contact information.
 - Sign up to the NRMM register.
 - Develop and implement a Dust Management Plan (DMP), to be approved by the Local Authority.
 - Record all complaints and incidents in a site log.
 - Make the complaints log available to the Local Authority if requested.
 - Ensure vehicles switch off engines when stationary.
 - Avoid use of diesel or petrol powered generators where possible.
 - Produce a Construction Logistics Plan to manage the sustainable delivery of materials.
 - Implement a sustainable travel plan for site workers.
 - Ensure suitable cleaning material is available at all times to clean up spills.
 - Avoid bonfires.
 - Inspect on-site haul roads for integrity and repair as necessary.
 - Inspections of haul roads to be recorded in site log, including any remedial action taken.

Operational Development

Traffic Assessment

- 8.57 The traffic assessment has been undertaken in line with the EPUK & IAQM guidance³⁵. Based on this the cumulative traffic data has been included in the baseline opening year (2023) scenario, in order to assess the impacts of the proposed development only, while also taking into account other developments in the area which could have an impact on the local air quality. From discussions between the traffic consultants, the RBG and TfL it was agreed that there is not anticipated to be any growth in the baseline traffic between the monitored year and the opening year.
- 8.58 For this assessment the following scenarios have been assessed using the ADMS dispersion model:
- Baseline 2015;
 - Baseline 2023 + cumulative traffic; and
 - Baseline 2023 + cumulative + development traffic.
- 8.59 The traffic data for the assessment have been provided by Transport Planning Practice Limited and is summarised in Technical Appendix 8.5 contained within Volume 3 of this ES.
- 8.60 Potential impacts on air quality due to local traffic emissions have been predicted using the ADMS Roads (version 4.0.1) dispersion model. This model has been extensively validated against both field and laboratory data sets and against monitoring data in cities throughout the UK.
- 8.61 DEFRA has recently provided updated background pollutant concentration maps (based on 2013 data) but even though the background maps have recently been updated, there is still uncertainty how pollutant concentrations will change in the future. To ensure a conservative approach all the modelling has utilised 2015 background pollutant concentrations and 2015 Emission Factors for the opening year of the development (2023).

- 8.62 ADMS Roads incorporates DEFRA's emission rates from the Emission Factor Toolkit. A new version of the Toolkit (v7) has been released²⁸ and there is currently no ADMS update available until late 2016, therefore version 6.0.2 has been used to predict roadside concentrations of nitrogen oxides (NO_x) and PM₁₀ for this assessment. The predicted concentrations of roadside NO_x require conversion to roadside NO₂ using the LAQM conversion calculator²⁹ available on the DEFRA air quality website to allow comparison with the NAQO.

Potential Operational Stack Impacts

- 8.63 Air quality impacts have been assessed using the Breeze AERMOD³⁰ air quality dispersion model. Breeze AERMOD uses representative meteorological data for the local area and plant emissions data to predict ambient concentrations of pollutants in the vicinity of the stack of the CHP, located on Building 3.
- 8.64 The Breeze AERMOD dispersion models have been widely validated for this type of assessment and are considered to be fit for purpose.

Stack Emission Parameters

- 8.65 A number of factors affect stack emission dispersion once released to the atmosphere:
- Physical characteristics of the emissions;
 - Climate;
 - Terrain; and
 - Building downwash.
- 8.66 Table 8.2 details the parameters used within the AERMOD stack dispersion model.

Parameter	CHP (1 Unit)	Boilers (3 Units)
Model	Ener-G E210 (Low NO _x)	Hoval UltraGas 300
Assumed OS grid coordinates of stack	541078, 178722	
Stack height above ground (m)	92.4*	92.4*
Flue diameter (m)	0.177	0.127
Exit temperature (°C)	120	71
Efflux velocity (m/s)	10	10
NO_x emission rate (g/s)	0.0085	0.0025 (each)
Operating Hours (worst case)	17 (7am-midnight)	24
*At the time of modelling the stack height above ground measured 95.4m, however it is considered that as it is an insignificant change this will not affect the outcome of the assessment.		

Underground Car Park Emissions

- 8.67 The emissions from the underground car park on Plot A were included within the stacks modelling assessment. For the proposed emissions the Emission Factor Spreadsheet v7³¹ was utilised with using

²⁸ DEFRA. 2016. Emissions Factors Toolkit. [ONLINE] Available at: <http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>. [Accessed October 2016].

²⁹ DEFRA. 2016. *NO_x to NO₂ Calculator*. [ONLINE] Available at: <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>. [Accessed October 2016].

³⁰ Trinity Consultants. Breeze Aermod v7.11.0.37. <http://www.breeze-software.com/AERMOD/>

³¹ Emission Factor Toolkit v7.0 Released July 2016 Developed on behalf of Defra and the Devolved Administrations by Bureau Veritas. http://laqm.defra.gov.uk/documents/EFT2016_v7.0.xlsb.zip [sourced October 2016]

the year 2020, to take into account the high number of electric vehicle spaces which will be included in the development and are provided in Technical Appendix 8.5 contained within Volume 3 of this ES.

Meteorological Data

8.68 Meteorological (Met) data, such as wind speed and direction, are used by the model to determine pollutant transportation and dilution. Met data used in this assessment was collected at the Met Office observing station at London City Airport, 1km north-east of the application site. Data was obtained for years 2011 to 2015. Table 8.3 identifies the results of the worst case meteorological data assessment.

Table 8.3: Determination of worst case meteorological year

Year	Maximum grid ($\mu\text{g}/\text{m}^3$)	Maximum sensitive receptor ($\mu\text{g}/\text{m}^3$)	Maximum grid ($\mu\text{g}/\text{m}^3$)	Maximum sensitive receptor ($\mu\text{g}/\text{m}^3$)
	Annual mean		Hourly mean NO_x (NO_2)	
2011	1.66	0.48	49.76	9.86
2012	1.20	0.51	67.62	15.34
2013	1.43	0.51	65.44	12.67
2014	1.72	0.47	77.07	21.68
2015	4.87	0.51	133.67	14.46
Maximum concentration as a percentage of NAQO for worst year	12.18	1.28	66.84	10.84

8.69 Based on the meteorological data assessment, 2015 is considered to be the worst case year which produced the highest pollutant concentrations across the whole modelled area as well as the worst case sensitive receptors for the annual mean. For the hourly concentrations, 2015 represents the worst case for the whole modelling area but not the maximum for the worst case sensitive receptor, therefore for the hourly scenario 2014 was utilised as this represents the worst case receptor. The windroses for 2014 and 2015 meteorological data used within the assessment are provided in Figures 8.3 and 8.4. The prevailing wind direction at the proposed development is south-westerly.

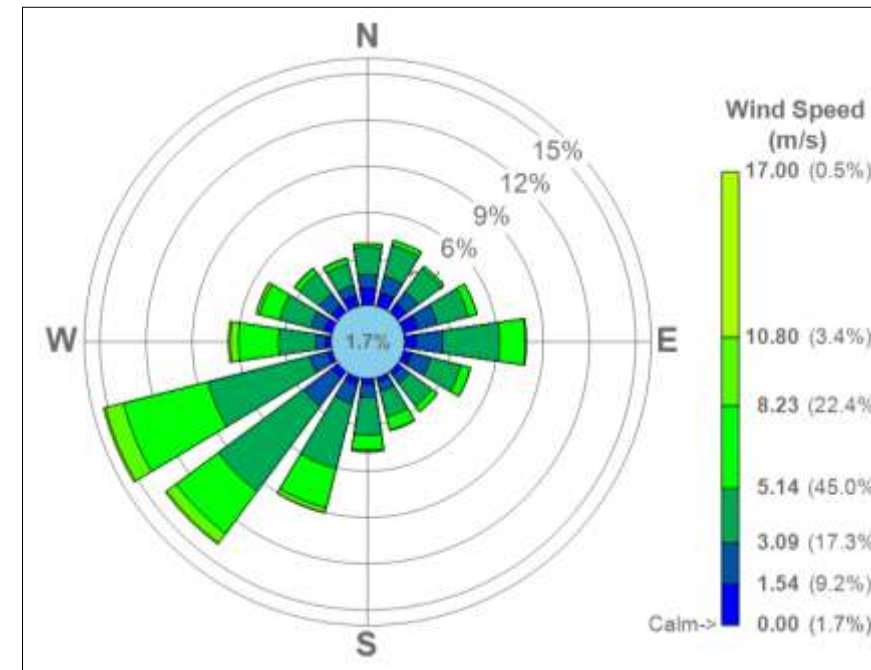


Figure 8.3 London City Airport 2014 Meteorological Data

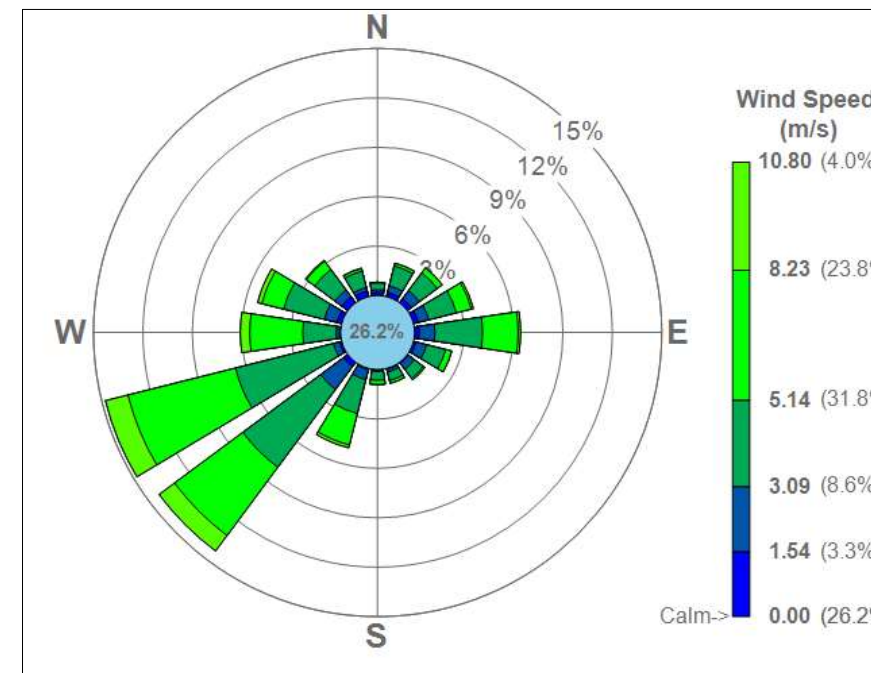


Figure 8.4 London City Airport 2015 Meteorological Data

8.70 The modelling results of the energy centre emissions, car park emissions and operational traffic emissions have been combined for each sensitive receptor.

Air Quality Neutral Assessment

8.71 The air quality neutral approach compares the amount of pollutant(s) emitted from the proposed development (road traffic and buildings emissions) against a set benchmark value, with the aim of minimising the mass of pollutant emitted, rather than targeting the ambient concentration of the pollutant.

8.72 In accordance with the GLA’s Sustainable Design and Construction SPG³², an air quality neutral assessment has been undertaken using the latest information about the proposed development. The methodology and emission factors are taken from the Air Quality Neutral Planning Support Document³³.

8.73 Benchmarks are provided for each of the three areas within London: the Central Area Zone (CAZ), Inner and Outer London. The proposed development is within Inner London³⁴.

Significance Criteria

Demolition, Site Preparation, Earthworks and Construction Phase

8.74 Published guidance from the IAQM sets out criteria and general conditions which can be applied to construction sites to predict the magnitude of the dust emissions from activities such as demolition, earthworks, construction and trackout. IAQM classifies the magnitude as low, medium or high and this is then compared to the distance to the nearest human or ecological receptor to determine the level of risk.

8.75 Risks are described in terms of there being a low, medium or high risk of dust effects for each of the four separate potential activities. A summary of the risk of effects with and without mitigation is then produced.

8.76 Significance criteria from IAQM and EPUK’s Planning Guidance (2015)³⁵ which relates to concentrations of NO₂ and PM₁₀ have been used to assess changes in concentrations relating to construction traffic emissions. The absolute concentration at the receptor is taken into consideration i.e. if the concentration at a receptor is close to or above the UK air quality objective level, marginal changes in magnitude may be determined to be moderate, however if the concentration at the receptor is less than 75% of the UK air quality objective level marginal changes in magnitude may be determined to be negligible. Overall significance is determined by professional judgement.

8.77 The criteria are presented in Table 8.4 below.

Long Term Average Concentration at Receptor with Development	Percentage Change in Concentration Relative to Annual Mean Air Quality Objective (AQO)			
	<1	2 - 5	6 - 10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 – 94% of AQO	Negligible	Slight	Moderate	Moderate
95 – 102% of AQO	Slight	Moderate	Moderate	Substantial
103 – 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% of more of AQO	Moderate	Substantial	Substantial	Substantial

Operational Phase

8.78 Significance criteria from IAQM and EPUK’s Planning Guidance as stated within paragraph 8.76 and detailed in Table 8.4 have been used to assess changes in concentrations relating to operational traffic and energy centre emissions.

Assumptions and Limitations

8.79 The following assumptions are relevant to this chapter:

- All traffic data utilised in this assessment have been provided by Transport Planning Practice Limited;
- Construction of the proposed development is anticipated to take place between 2018 and 2023, with the peak period of construction mid-2020.
- The locations of the CHP, boiler stacks and car park ventilation extracts as modelled in this assessment are shown in Figure 8.5.
- To take a conservative approach to the assessment of the CHP and boiler emissions the NO_x to NO₂ conversion rate is assumed to be 100% for long term (annual) and 50% for short term (1-hour) and the results presented can therefore be considered to represent a conservative assessment of likely concentrations resulting from operation of the CHP and boiler units.
- London City Airport meteorological data was also utilised for the stack modelling assessment and, following a “worst case scenario” analysis, it was determined for the stack test the 2015 meteorological data would be utilised.
- Sensitive receptor locations have been chosen to represent similar receptors in the vicinity of the application site. A 1km grid of receptors spaced every 20m at ground level has been used for the CHP, boiler and car park ventilation modelling outputs.



Figure 8.5 Energy Centre Stacks and Car Park Ventilation Modelling Locations

³² Sustainable Design and Construction SPG. Mayor of London, Greater London Authority, London 2014

³³ Air Quality Neutral Planning Support Update: GLA 80371. Air Quality Consultants & Environ, 2014

³⁴ List of inner/outer London boroughs <http://www.londoncouncils.gov.uk/node/1938>

³⁵ EPUK & IAQM. Land-Use Planning & Development Control: Planning For Air Quality, 2015

8.80 The following limitations are relevant to this chapter:

- Calculations to provide vehicle emission factors and to convert NO_x to NO₂ use accepted methods and are published on behalf of the Department of Transport (DfT) and DEFRA. The most up to date version of the calculators at the time of writing has been used in this assessment. Emission factors and background pollutant concentrations from 2015 have been utilised as a worst case scenario.
- Diffusion tube results used in the model verification have a level of uncertainty of ±20%. 2015 measured data was utilised for all modelling scenarios.
- ADMS Roads software was utilised for the traffic modelling. The modelling scenarios were run using free-flow links with average speed values although slower speeds were used near junctions. The surface roughness of 1.00 (urban) was used.
- London City Airport meteorological data was used in the traffic modelling scenarios. The verification model used 2015 to correspond with the 2015 monitoring data which was available and took into consideration normal traffic patterns. Modelling for baseline (2015) and future years with and without the proposed development also used 2015 meteorological data.

Baseline Conditions

Current Baseline

Existing Air Quality

Local Air Quality Monitoring - Nitrogen Dioxide

8.81 In order to establish baseline air quality in the vicinity of the application site, relevant monitoring data has been reviewed and assessed. There are a large number of monitoring sites within Greenwich including four locations within 1km of the application site boundary. The closest monitor is located approximate 220m south of the application site (Woolwich Road DT). Data was obtained from the RBG Air Quality Progress Reports and the London Wide Environment Program Nitrogen Dioxide Diffusion Tube Survey Report 2015³⁶. The data is presented in Table 8.5.

Monitor	Years						
	Site Type	Distance to kerb (m)	2011	2012	2013	2014*	2015
Annual Mean (40µg/m³)							
Woolwich Flyover (GR8) - CM	R	3.0	67	71	64	75	66
Millennium Village (GN2) (previously GR12) - CM	BG	N/A	33	37	38	36	28
Woolwich Road GW29(6) - DT	R	1.5	65.0	66.6	65.2	61.8	62.3
Woolwich Flyover GW50(25, 26, 27) collocated with GR8 -DT	R	3.5	75.5	75.9	67.5	73.9	70.7

³⁶ Royal Borough of Greenwich. 2015. *London Wide Environment Program Nitrogen Dioxide diffusion tube survey report 2015*. [ONLINE] Available at: http://www.royalgreenwich.gov.uk/downloads/file/3082/london_wide_environment_program_nitrogen_dioxide_diffusion_tube_survey_report_2015. [Accessed 28 September 2016].

Millennium Village GW61(50, 51, 52) triplicate collocated with GN2 - DT	BG	N/A	40.7	40.0	39.1	35.2	30.5
Number of Hours exceeding 200µg/m³ (18 exceedances allowed)							
Woolwich Flyover (GR8) - CM	R	3.0	6	27	8	26	6
Millennium Village (GN2) - CM	BG	N/A	0	2	2	0 (151.5)	0

Notes:
 CM: Continuous Monitor, DT: Diffusion Tube
 R: Roadside, BG: Background
Bold: concentrations in exceedance of NAQO (40µg/m³)
Bold underlined: concentrations above 60µg/m³ indicating potential exceedances of the short term NO₂ NAQO.
 N/A: Not Available
 *Where period of valid data is less than 90%, the 99.8th percentile of hourly means is included in brackets.

8.82 The NO₂ results from the Woolwich Flyover Automatic Station and the Woolwich Road diffusion tube show exceedances of the annual mean NAQO for the last five years of available data. The Woolwich Flyover site also identified more than the 18 allowed exceedances of the 1 hour mean in 2012 and 2014. The Woolwich Flyover monitoring site (approximately 930m west of the proposed development) is located to the east of a very heavily trafficked 6 lane carriageway which is subject to frequent traffic congestion. The Woolwich Road diffusion tube (approximately 220m south of the development) is located to the south of Woolwich Road, close to the signalised junction with Anchor and Hope Lane, the road is heavily trafficked and is subject to frequent congestion and a bus stop is also located close to the monitoring site.

8.83 All of the roadside monitoring locations have significantly exceeded the NAQO for the last five years, but all seem to show some reduction in pollutant concentrations in 2015 but still remain significantly above the NAQO.

8.84 The Millennium Village automatic background monitor has recorded pollutant concentration levels just below the NAQO between 2011 and 2014, with a bigger reduction in 2015. The triplicate diffusion tubes recorded slight exceedances in 2011 and 2012 and reductions to just below the NAQO in 2013 and further reductions in 2014 and 2015.

Local Air Quality Monitoring - Particulate Matter (PM₁₀)

8.85 There are two background PM₁₀ monitors within 1km of the application site. The data recorded by these monitors since 2011 is recorded in Table 8.6 below.

Objective	Site Type	Distance to kerb (m)	Years				
			2011	2012	2013	2014*	2015
Annual Mean (40µg/m³)							
Woolwich Flyover (GR8) - CM	R	3.0	35	33	32	29	29
Millennium Village (GN2) - CM	BG	N/A	25	23	26	26 (25.5)	17

Table 8.6: PM₁₀ Concentrations Recorded at Automatic Station

Number of Days Exceeding Daily Mean (50µg/m ³ - 35 exceedances allowed)							
Woolwich Flyover (GR8) - CM	R	3.0	42	33	26	17 (45.8)	18
Millennium Village (GN2) - CM	BG	N/A	25	20	20 (46)	16 (48.4)	1

Notes:
CM: Continuous Monitor
Bold: concentrations in exceedance of NAQO
NA: Not Available
*Means "annualised" as in Box 3.2 of TG (09), if monitoring was not carried out for the full year.

8.86 The automatic PM₁₀ monitors identify that there are no exceedances of the annual mean NAQO between 2011 and 2015. At the Woolwich Flyover there were 42 daily exceedances of the mean in 2011, exceeding the allowed 35 days, but the number had reduced to less than half the number of exceedances by 2014 and remained at a similar level in 2015.

8.87 In addition to the local PM₁₀ monitors, three months of background monitoring was also undertaken at the application site from 26th July until 25th October 2016. These results were averaged over each month of monitoring and then annualised utilising the method in TG (16) and the London North Kensington Urban Background Automatic Urban and Rural Network (AURN) Monitor. As there is not a full year of 2016 data, the monitoring period was compared and annualised using 2015 data.

Table 8.7: On-site PM₁₀ Monitoring Summary Results

Site Location		Month 1	Month 2	Month 3	Average	Annualised	Annual Objective Met?
Access Solutions	24 hour	16.5	16.8	15.6	16.3	18.1	Yes
Unit 24	24 hour	20.5	18.2	18.0	18.9	21.0	Yes

8.88 Background pollutant concentrations for the application site and the local monitoring stations has also been obtained from DEFRA and shown in Table 8.8 below.

Table 8.8: Background Pollutant Concentrations for 2015

Location	X	Y	NO _x	NO ₂	PM ₁₀	PM _{2.5}
Site and GW29	540500	178500	40.6	26.1	18.9	13.5

Dispersion Modelling Baseline 2015

8.89 Dispersion modelling was undertaken using ADMS Roads to provide 2015 baseline data for existing receptors in the vicinity of the application site. A verification year scenario was modelled, utilising 2015 meteorological data, monitoring data from the Woolwich Road diffusion tube and 2015 traffic data. A road NO_x verification factor of 1.7 was obtained. Model outputs for the 2015 baseline were adjusted by this number for both NO₂ and PM₁₀. The model verification calculations can be seen in Technical Appendix 8.6 contained within Volume 3 of this ES.

8.90 Baseline NO₂ modelling (annual mean) concentrations show that existing locations within the local area experience pollutant concentration levels between 29.1µg/m³ and 56.8µg/m³ in 2015. The existing receptors, which are located adjacent to Woolwich Road, are predicted to exceed the annual NAQO, some significantly.

8.91 Baseline PM₁₀ modelling (annual mean) concentrations show that roadside locations have been between 13.9µg/m³ and 17.9µg/m³ in 2015. None of the existing receptors are predicted to currently exceed the annual NAQO.

8.92 Predicted concentrations at all modelled receptors are within the daily mean UK air quality objective for PM₁₀. This corresponds with the monitored PM₁₀ daily mean concentrations meeting the UK air quality objective in 2015.

8.93 Existing air quality at the application site is likely to be within the UK air quality objectives for both NO₂ and PM₁₀.

Sensitive Receptors

Existing Sensitive Receptors

8.94 Table 8.9 identifies the existing sensitive receptors in close proximity to the application site which could be impacted as a result of the proposed development. A location plan for the receptors is provided below in Figure 8.6. The receptor ID refers to its location on the plan.

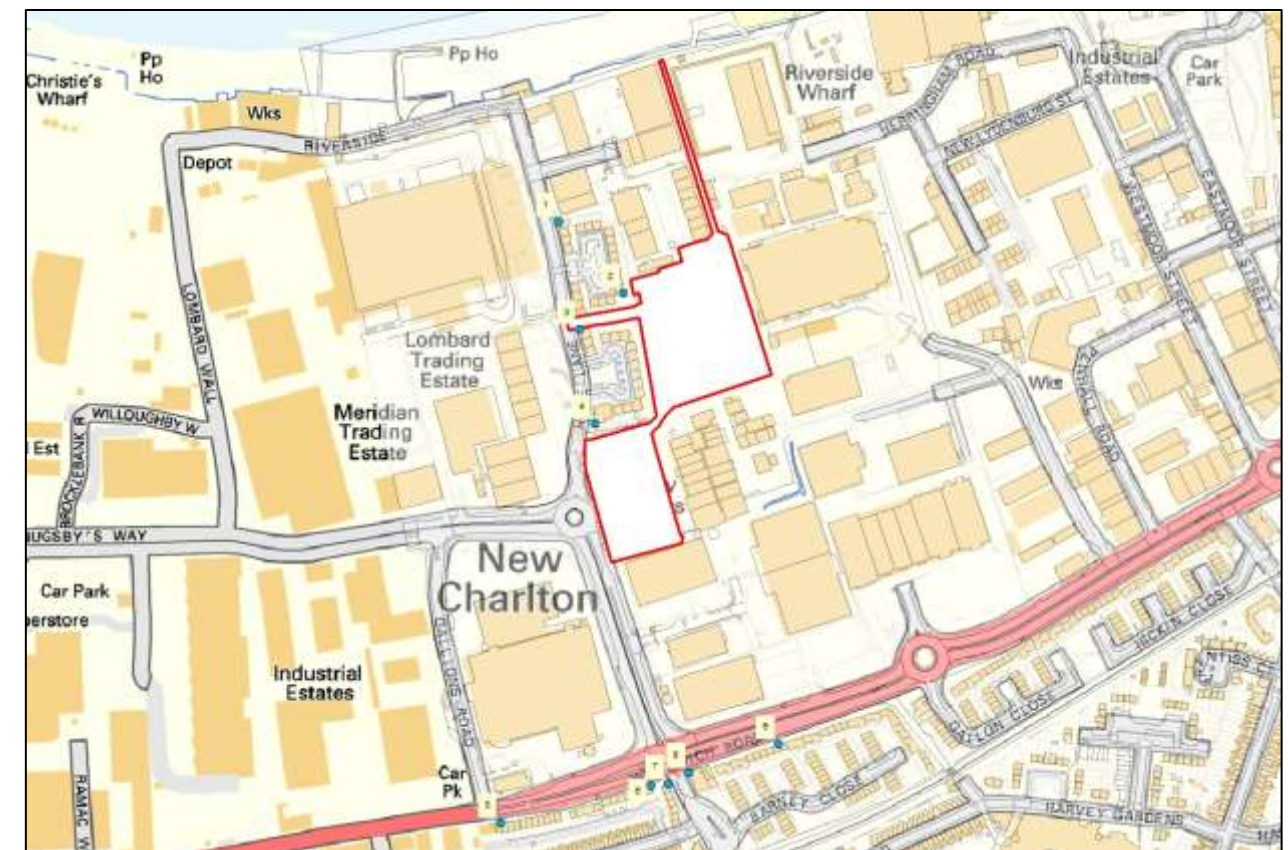


Figure 8.6 Existing Receptor Modelling Locations

Table 8.9: Existing Sensitive Receptors

Receptor		Description	Coordinates		Height	Floor	Type	Long / Short Term
No.	ID		X	Y				
1	1	Derrick Gardens	541009	179032	1.5	0	Residential	LT
2	2	Derrick Gardens	541072	178962	1.5	0	Residential	LT
3	3	Atlas Gardens	541029	178927	1.5	0	Residential	LT
4	4	Anchor and Hope Lane	541044	178836	1.5	0	Residential	LT
5	5	Woolwich Road	540953	178447	1.5	0	Residential	LT
6	6	Woolwich Road	541099	178483	1.5	0	Residential	LT
7	7	Woolwich Road	541116	178485	1.5	0	Residential	LT
8	8	The Antigallican Hotel	541136	178496	1.5	0	Hotel	LT
9	9	Woolwich Road	541223	178524	1.5	0	Residential	LT

New Sensitive Receptors

8.95 Tables 8.10 identifies the proposed sensitive receptors which will be created as part of the proposed development to determine if any mitigation will be required as a result of the local pollutant concentration levels. A location plan for the introduced receptors is provided in Figure 8.7. The receptor ID refers to its location on the plan.



Figure 8.7 New Receptor Modelling Locations

Table 8.10: Proposed Sensitive Receptors

Receptor		Description	Coordinates		Height	Floor	Type	Long / Short Term
No.	ID		X	Y				
10	10	Building 3	541069	178711	1.5	0	Outdoor	ST
11	11	Building 3	541085	178722	1.5	0	Outdoor	ST
12	12	Building 3	541069	178732	1.5	0	Outdoor	ST
13	13	Building B West	541061	178747	5.5	0	Residential	LT
14	14	Building B West	541077	178750	5.5	0	Residential	LT
15	15	Building B West	541050	178803	5.5	0	Residential	LT
16	16	Building B West	541065	178807	5.5	0	Residential	LT
17	17	Building B East	541108	178718	1.5	0	Residential	LT
18	18	Building B East	541097	178804	1.5	0	Residential	LT
19	19	Building A West South	541112	178860	1.5	0	Residential	ST
20	20	Building 2	541146	178913	1.5	0	Residential space	ST
21	23	Building A West South	541096	178939	1.5	0	Residential	LT
22	24	Outdoor Area	541158	178930	1.5	1	Outdoor	ST
23	26	Building 1	541128	178955	1.5	1	Community Use	LT
24	27	Outdoor Area	541150	178974	1.5	1	Outdoor	ST
25	21	Building A East South	541172	178879	1.5	1	Outdoor	ST
26	22	Building A East South	541193	178923	1.5	0	Outdoor	ST
27	21	Building A East South	541172	178879	8.9	0	Residential	LT
28	22	Building A East South	541193	178923	8.9	0	Residential	LT
29	25	Building A East North	541173	178930	8.9	0	Residential	LT
30	28	Building A East North	541147	179010	5.9	0	Residential	LT
31	10	Building 3	541069	178711	8.5	0	Residential	LT
32	11	Building 3	541085	178722	8.5	0	Residential	LT
33	12	Building 3	541069	178732	8.5	0	Residential	LT
34	10	Building 3	541069	178711	84.3	0	Residential	LT
35	11	Building 3	541085	178722	84.3	0	Residential	LT

Receptor ID	Plot	Building Name	Address	Postcode	Distance (m)	Height (m)	Use	Category
36	12	Building 3	541069	178732	84.3	2	Residential	LT
37	10	Building 3	541069	178711	87.5	2	Outdoor	ST
38	11	Building 3	541085	178722	87.5	2	Outdoor	ST
39	12	Building 3	541069	178732	87.5	1	Outdoor	ST
40	13	Building B West	541061	178747	26.7	2	Residential	LT
41	14	Building B West	541077	178750	26.7	2	Residential	LT
42	15	Building B West	541050	178803	26.7	2	Residential	LT
43	16	Building B West	541065	178807	26.7	28	Residential	LT
44	13	Building B West	541061	178747	29.9	28	Outdoor	ST
45	14	Building B West	541077	178750	29.9	28	Outdoor	ST
46	15	Building B West	541050	178803	29.9	Roof	Outdoor	ST
47	16	Building B West	541065	178807	29.9	Roof	Outdoor	ST
48	17	Building B East	541108	178718	5.5	Roof	Residential	LT
49	18	Building B East	541097	178804	5.5	8	Residential	LT
50	17	Building B East	541108	178718	33.1	8	Residential	LT
51	18	Building B East	541097	178804	33.1	8	Residential	LT
52	17	Building B East	541108	178718	36.3	8	Outdoor	ST
53	18	Building B East	541097	178804	36.3	Roof	Outdoor	ST
54	19	Building A West South	541112	178860	24.8	Roof	Outdoor	ST
55	19	Building A West South	541112	178860	17.1	Roof	Residential	LT
56	20	Building 2	541146	178913	42.9	Roof	Residential	LT
57	20	Building 2	541146	178913	45.9	1	Outdoor	ST
58	23	Building A West South	541096	178939	24.8	1	Outdoor	ST
59	23	Building A West South	541096	178939	17.1	10	Residential	LT
60	26	Building 1	541128	178955	48.9	10	Residential	LT
61	26	Building 1	541128	178955	52.0	Roof	Outdoor	ST
62	21	Building A East South	541172	178879	39.7	Roof	Outdoor	ST
63	22	Building A East South	541193	178923	39.7	Roof	Outdoor	ST
64	28	Building A East North	541166	179005	34.6	5	Residential	LT

65	28	Building A East North	541147	179010	37.8	13	Outdoor	ST
----	----	-----------------------	--------	--------	------	----	---------	----

Potential Effects

Demolition and Construction

8.96 When considering the best practice control measures detailed within paragraph 8.56 and in the absence of any additional mitigation measures, there are two potentially significant sources of emissions that could affect air quality during demolition and construction works:

- Coarse and fine dust from demolition and construction activities including demolition, excavation, earthmoving, materials storage, movement of construction vehicles and trackout; and
- Demolition and construction vehicle emissions on local roads in the vicinity of the application site.

8.97 The IAQM Dust Guidance's Step 1 is to determine if sensitive receptors are within 350m of the boundary of the application site. Figure 8.2 shows there is a number of sensitive receptors within 350m of the application site and therefore it is concluded that a detailed assessment is required.

Step 2A - Define the Potential Dust Emission Magnitude

8.98 The dust emission magnitude has been determined to be 'Large' for all activities (demolition, earthworks, construction and trackout) as summarised in Table 8.11 below.

Activity	Dust Emission Magnitude	Justification
Demolition	Large	Total building volume >50,000m ³
Earthworks	Large	Total site area >10,000m ²
Construction	Large	Total building volume >100,000m ³
Trackout	Large	Outward vehicle movements >50 in any one day

Step 2B - Define the Sensitivity of the Area

8.99 Receptor sensitivity is determined depending on sensitivity to dust soiling, health effects of PM₁₀ and ecological effects. For each category the distance to the source is taken into account to determine the sensitivity of the area.

Dust Soiling Effects

8.100 Receptors within 20m include existing residential properties in Derrick Gardens and Atlas Gardens and also new residential receptors located within Plot B when Plot A is being prepared and constructed. Therefore in accordance with IAQM Guidance it is determined that the receptor sensitivity for people and property is 'High'. The number of sensitive receptors within 20m of the application site boundary is greater than 100, therefore the sensitivity of the area is determined to be 'High'.

Human Health Effects

8.101 Receptors within 20m include existing residential properties in Derrick Gardens and Atlas Gardens and also new residential receptors located within Plot B when Plot A is being prepared and constructed. Therefore in accordance with IAQM Guidance it is determined that the receptor sensitivity for health effects is 'High'. For health effects the annual mean PM₁₀ concentration is also taken into account. The number of sensitive receptors within 20m of the application site boundary is greater than 100 and the annual mean PM₁₀ concentration is less than 24µg/m³, therefore the sensitivity of the area is determined to be 'Medium'.

Ecological Effects

8.102 Sensitivity of ecological receptors is determined to be 'High' sensitivity in accordance with the Guidance. However, the closest ecologically sensitive receptor is approximately 650m away from the application site boundary. Therefore the sensitivity of the area within the study area is determined to be 'Not Sensitive'.

8.103 The results of Step 2B are summarised in Table 8.12.

Table 8.12: Sensitivity of Area to Dust Impacts (taking into account distance to construction activity)		
Sensitivity to Dust Soiling	Sensitivity to Human Health Impacts	Sensitivity to Ecological Receptors
High (>100 properties within 20m)	Medium (>100 properties within 20m, annual mean PM ₁₀ <24µg/m ³)	N/A – closest receptor over 600m away from the application site (A206 between application site and SSSI)

Step 2C - Define the Risk of Impacts

8.104 The dust emission magnitude determined in Step 2A has been combined with the sensitivity of the area determined in Step 2B to determine the risk of impacts with no mitigation applied and is shown in Table 8.13.

Table 8.13: Risk of Dust Impacts in the Absence of Mitigation For Each Construction Activity					
Effect	Sensitivity of Surrounding Areas	Dust Emission Magnitude			
		Demolition (Large)	Earthworks (Large)	Construction (Large)	Trackout (Large)
Dust Soiling	High	High Risk	High Risk	High Risk	High Risk
Human Health	Medium	High Risk	Medium Risk	Medium Risk	Medium Risk
Ecological Receptors	Not Sensitive	No Risk	No Risk	No Risk	No Risk

8.105 The dust effects prior to mitigation are likely to be substantial and significant for dust soiling and moderate and significant for health effects. Both these effects would be temporary and reversible.

Peak Construction Traffic Assessment

8.106 The assessment of the peak construction period has been assessed compared to the 2015 baseline year. During the construction period there will be an overall reduction in traffic, compared to the current operational site use. Tables 8.14 and 8.15 identify that during the construction period there will be a no change to negligible impact as a result of the construction traffic for both NO₂ and PM₁₀, compared to the current situation on-site.

Table 8.14: Predicted Annual Mean NO₂ Concentrations at Existing Sensitive Receptors for Peak Construction Period (µg/m³)				
Receptor No.	2015 Baseline (µg/m³)	Peak Construction Period (µg/m³)	% Change in concentration relative to NAQO	Significance
1	30.9	30.9	0.0	No Change
2	29.1	29.1	0.0	No Change
3	32.3	32.3	0.0	No Change

Table 8.14: Predicted Annual Mean NO₂ Concentrations at Existing Sensitive Receptors for Peak Construction Period (µg/m³)				
4	34.4	34.2	0.5	Negligible
5	49.1	49.1	0.0	No Change
6	49.1	49.0	0.3	Negligible
7	50.2	50.0	0.5	Negligible
8	56.9	56.7	0.5	Negligible
9	55.4	55.3	0.3	Negligible

Bold: concentrations in exceedance of NAQO

Table 8.15: Predicted Annual Mean PM₁₀ Concentrations at Existing Sensitive Receptors for Peak Construction Period (µg/m³)				
Receptor No.	2015 Baseline (µg/m³)	Peak Construction Period (µg/m³)	% Change in concentration relative to NAQO	Significance
1	14.0	14.0	0.0	No Change
2	13.9	13.9	0.0	No Change
3	14.2	14.2	0.0	No Change
4	14.5	14.5	0.1	Negligible
5	17.0	17.0	0.0	No Change
6	16.8	16.8	0.0	No Change
7	16.9	16.9	0.0	No Change
8	17.9	17.9	0.1	Negligible
9	17.4	17.4	0.1	Negligible

Bold: concentrations in exceedance of NAQO

Completed Development

Traffic and Energy Assessment – NO₂

8.107 Operational impacts on local air quality will arise from exhaust emissions associated with vehicle movements, generated as a result of the proposed development, and the proposed energy centre which is to be located within the proposed development. Emissions from road traffic are the major contributor to poor air quality in urban areas within the UK and could contribute to exceedance of the current air quality objectives within the vicinity of the application site. Accordingly, the potential impacts associated with additional vehicle trips generated by the proposed development have been considered within this assessment. Emissions from the energy centre will also be assessed as the proposed development is located in an AQMA.

8.108 Existing (or projected) air quality can also impact the future occupants of the proposed development, through the introduction of new sensitive receptors into an area of poor air quality.

8.109 The emissions from the car park ventilation and energy centre have been included in the 2023 Baseline + cumulative + development scenario.

8.110 Table 8.16 identifies that for the completed development opening year existing sensitive receptors are predicted, at worst, to experience a negligible effect as a result of the proposed development. Three of the modelled receptors have been predicted to exceed the annual mean objective for NO₂ in 2015 and are predicted to remain above the objective in 2023. The modelling was undertaken utilising the 2015 emission factors and background pollutant concentrations to represent a worst case scenario. The proposed development will not cause any exceedances of the NAQO which were not already experienced due to heavily trafficked local roads.

Table 8.16: Predicted Annual Mean NO₂ Concentrations at Existing Sensitive Receptors (µg/m³)

Receptor No.	2015 Baseline (µg/m ³)	2023 Baseline + Cumulative (µg/m ³)	2023 Baseline + Cumulative + Development (µg/m ³)	% Change in concentration relative to NAQO	Significance
1	30.9	31.0	31.0	0.0	No Change
2	29.1	29.2	29.2	0.0	No Change
3	32.3	32.4	32.4	0.0	No Change
4	34.4	34.5	34.6	0.3	Negligible
5	49.1	49.3	49.3	0.0	No Change
6	49.1	49.4	49.4	0.0	No Change
7	50.2	50.5	50.5	0.0	No Change
8	56.9	57.3	57.4	0.3	Negligible
9	55.4	55.8	55.9	0.3	Negligible

Bold: concentrations in exceedance of NAQO

8.111 Table 8.17 presents the NO₂ concentrations for the proposed development to assess site suitability focusing on each of the newly created receptors discussed earlier in the chapter. There is predicted to be one exceedance of the annual mean objective on the ground floor of the south-west corner of Building 3 (Receptor 10), however, this is an external receptor and therefore as this concentration is below 60µg/m³ it is likely that the hourly mean would not be exceeded³⁷. At the second floor of Building 3, where there is a residential receptor, the NO₂ pollutant concentrations is predicted to be lower (31.7µg/m³), and therefore concentrations within the proposed development do not exceed any of the relevant air quality objectives.

8.112 The predicted NO₂ (annual mean) concentrations for all introduced receptors are also significantly below 60µg/m³ in 2015. This indicates that the hourly mean objective is unlikely to be exceeded at the modelled outdoor receptors where the hourly mean would apply. The annual pollutant concentration modelling identified that the worst case receptor was located on the ground floor, 1.5m above ground level at block Building East (Receptor - 17).

Table 8.17: Predicted Annual Mean NO₂ Concentrations at Proposed Sensitive Receptors (µg/m³)

Receptor No.	2023 Baseline + Cumulative + Development (µg/m ³)	Type	Long / Short Term	Annual NAQO Applicable
10	41.3	Outdoor	ST	No
11	36.8	Outdoor	ST	No

³⁷ Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedances of the one-hour mean. A. Cook 2008

Table 8.17: Predicted Annual Mean NO₂ Concentrations at Proposed Sensitive Receptors (µg/m³)

12	38.8	Outdoor	ST	No
13	34.4	Residential	LT	Yes
14	33.3	Residential	LT	Yes
15	32.7	Residential	LT	Yes
16	32.0	Residential	LT	Yes
17	34.6	Residential	LT	Yes
18	32.5	Residential	LT	Yes
19	31.3	Residential	ST	No
20	29.3	Residential space	ST	No
21	29.3	Residential	LT	Yes
22	29.0	Outdoor	ST	No
23	28.9	Community Use	LT	Yes
24	28.6	Outdoor	ST	No
25	30.0	Outdoor	ST	No
26	28.9	Outdoor	ST	No
27	28.6	Residential	LT	Yes
28	28.2	Residential	LT	Yes
29	28.2	Residential	LT	Yes
30	28.1	Residential	LT	Yes
31	31.7	Residential	LT	Yes
32	31.5	Residential	LT	Yes
33	31.7	Residential	LT	Yes
34	26.2	Residential	LT	Yes
35	26.3	Residential	LT	Yes
36	26.3	Residential	LT	Yes
37	26.2	Outdoor	ST	No
38	26.3	Outdoor	ST	No
39	26.3	Outdoor	ST	No

Receptor ID	Concentration (µg/m ³)	Receptor Type	Location	Exceeds Limit
40	26.8	Residential	LT	Yes
41	26.9	Residential	LT	Yes
42	26.7	Residential	LT	Yes
43	26.7	Residential	LT	Yes
44	26.7	Outdoor	ST	No
45	26.8	Outdoor	ST	No
46	26.6	Outdoor	ST	No
47	26.6	Outdoor	ST	No
48	32.7	Residential	LT	Yes
49	31.2	Residential	LT	Yes
50	26.7	Residential	LT	Yes
51	26.5	Residential	LT	Yes
52	26.6	Outdoor	ST	No
53	26.5	Outdoor	ST	No
54	26.8	Outdoor	ST	No
55	27.5	Residential	LT	Yes
56	26.3	Residential	LT	Yes
57	26.3	Outdoor	ST	No
58	26.7	Outdoor	ST	No
59	27.2	Residential	LT	Yes
60	26.3	Residential	LT	Yes
61	26.3	Outdoor	ST	No
62	26.4	Outdoor	ST	No

63	26.4	Outdoor	ST	No
64	26.4	Residential	LT	Yes
65	26.4	Outdoor	ST	No

8.113 Contour plots are provided in Figures 8.8 and 8.9 and presents the results from both stack sources (energy centre and car park ventilation) at 1.5m above ground level across the whole of the application site area.

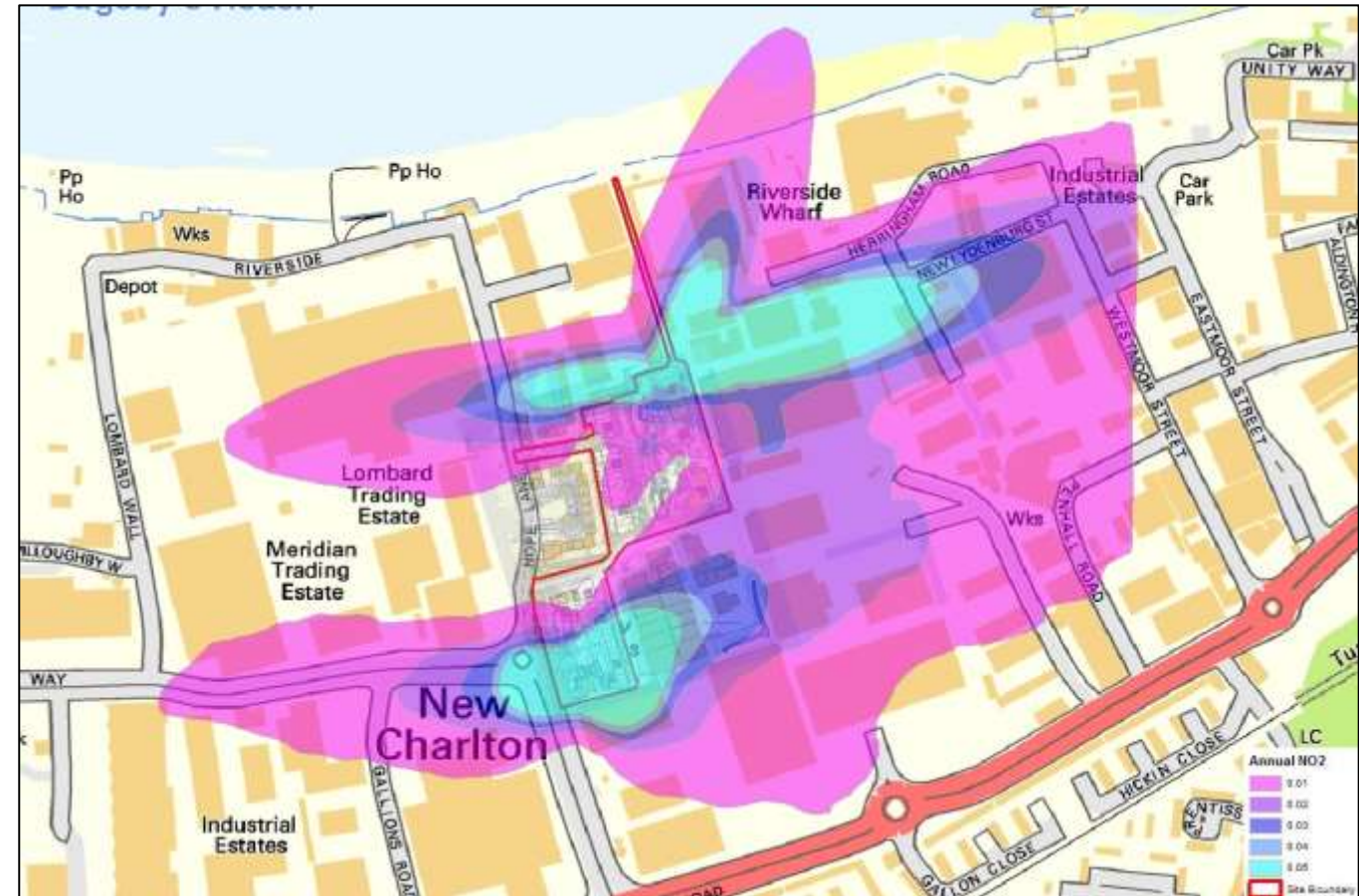


Figure 8.8 Annual Mean Contour Plot – NO₂ Stack Sources

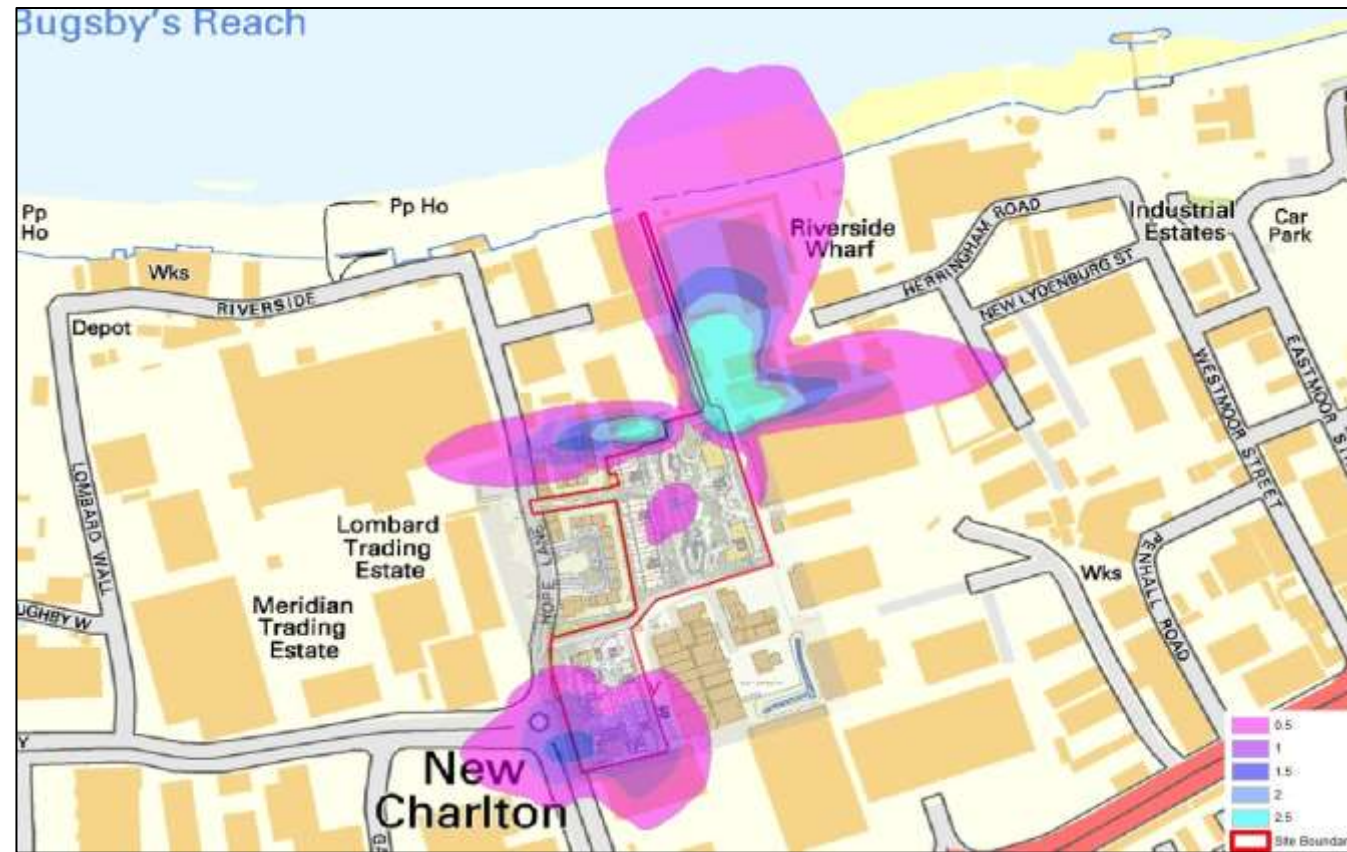


Figure 8.9 Daily Mean Contour Plot – NO₂ Stack Sources

Traffic Assessment – PM₁₀

8.114 Operational impacts on local air quality will arise from exhaust emissions associated with vehicle movements generated as a result of the proposed development. There are not anticipated to be any PM₁₀ emissions from the energy centre as it is proposed that it will be powered by natural gas.

8.115 Table 8.18 identifies that none of the existing receptors will exceed the annual PM₁₀ annual objective. The modelling was undertaken utilising the 2015 emission factors and background pollutant concentrations to represent a worst case scenario. The proposed development will not cause any exceedances of the NAQO in 2023.

Receptor No.	2015 Baseline (µg/m ³)	2023 Baseline + Cumulative (µg/m ³)	2023 Baseline + Cumulative + Development (µg/m ³)	% Change in concentration relative to NAQO	Significance of Impact
1	14.0	14.0	14.0	0.0	No Change
2	13.9	13.9	13.9	0.0	No Change
3	14.2	14.2	14.2	0.0	No Change
4	14.5	14.5	14.6	0.2	Negligible
5	17.0	17.1	17.1	0.0	No Change
6	16.8	16.9	16.9	0.0	No Change
7	16.9	17.0	17.0	0.0	No Change
8	17.9	18.0	18.0	0.0	No Change

9	17.4	17.5	17.5	0.0	No Change
---	------	------	------	-----	-----------

8.116 Table 8.19 presents the PM₁₀ concentrations for the proposed development to assess site suitability. All newly created receptors associated with the proposed development are predicted to be well within the annual mean.

8.117 The predicted PM₁₀ (annual mean) concentrations for all receptors are also significantly below 40µg/m³ in 2023. This indicates that the daily mean objective is unlikely to be exceeded at the modelled outdoor receptors where the daily mean would apply.

Receptor No.	2023 Baseline + Cumulative + Development (µg/m ³)	No. Daily Exceedances	Type	Long / Short Term	Annual NAQO Applicable
10	15.7	0	Outdoor	ST	No
11	14.9	0	Outdoor	ST	No
12	15.2	0	Outdoor	ST	No
13	14.6	0	Residential	LT	Yes
14	14.4	0	Residential	LT	Yes
15	14.3	0	Residential	LT	Yes
16	14.3	0	Residential	LT	Yes
17	14.6	0	Residential	LT	Yes
18	14.3	0	Residential	LT	Yes
19	14.2	0	Residential	ST	No
20	13.9	0	Residential space	ST	No
21	13.9	0	Residential	LT	Yes
22	13.9	0	Outdoor	ST	No
23	13.8	0	Community Use	LT	Yes
24	13.8	0	Outdoor	ST	No
25	14.0	0	Outdoor	ST	No
26	13.8	0	Outdoor	ST	No
27	13.8	0	Residential	LT	Yes
28	13.8	0	Residential	LT	Yes
29	13.8	0	Residential	LT	Yes

Receptor ID	Annual Mean (µg/m ³)	Daily Mean (µg/m ³)	Receptor Type	Location	Impact
30	13.7	0	Residential	LT	Yes
31	14.2	0	Residential	LT	Yes
32	14.2	0	Residential	LT	Yes
33	14.2	0	Residential	LT	Yes
34	13.5	0	Residential	LT	Yes
35	13.5	0	Residential	LT	Yes
36	13.5	0	Residential	LT	Yes
37	13.5	0	Outdoor	ST	No
38	13.5	0	Outdoor	ST	No
39	13.5	0	Outdoor	ST	No
40	13.6	0	Residential	LT	Yes
41	13.6	0	Residential	LT	Yes
42	13.6	0	Residential	LT	Yes
43	13.6	0	Residential	LT	Yes
44	13.6	0	Outdoor	ST	No
45	13.6	0	Outdoor	ST	No
46	13.6	0	Outdoor	ST	No
47	13.6	0	Outdoor	ST	No
48	14.4	0	Residential	LT	Yes
49	14.2	0	Residential	LT	Yes
50	13.6	0	Residential	LT	Yes
51	13.6	0	Residential	LT	Yes
52	13.6	0	Outdoor	ST	No
53	13.5	0	Outdoor	ST	No
54	13.6	0	Outdoor	ST	No
55	13.7	0	Residential	LT	Yes
56	13.5	0	Residential	LT	Yes
57	13.5	0	Outdoor	ST	No

Receptor ID	Annual Mean (µg/m ³)	Daily Mean (µg/m ³)	Receptor Type	Location	Impact
58	13.6	0	Outdoor	ST	No
59	13.6	0	Residential	LT	Yes
60	13.5	0	Residential	LT	Yes
61	13.5	0	Outdoor	ST	No
62	13.5	0	Outdoor	ST	No
63	13.5	0	Outdoor	ST	No
64	13.5	0	Residential	LT	Yes
65	13.5	0	Outdoor	ST	No

Site Suitability

- 8.118 The predicted NO₂ and PM₁₀ pollutant concentrations at the proposed development are not predicted to exceed any of the annual, daily or hourly objectives. All new residential receptor locations fall within the London Council's APEC Category A (>5% below the national objective) for both NO₂ and PM₁₀ annual means which recommends "no air quality grounds for refusal; however mitigation of any emissions should be considered".
- 8.119 The particulate matter monitoring has indicated that PM₁₀ levels at the proposed development are well within the annual and daily objectives.
- 8.120 The odour diary undertaken by Ramboll Environ has indicated that any odours present close to the application site (Locations 1, 2, 3 and 4) were attributable to the current on-site activities which would not be present once the proposed development was complete and operational. Other locations where odours were detected (Locations 6 and 8) are Part B processes which are regulated by the RBG and were not detected at the application site.
- 8.121 Therefore in terms of sensitive receptors, the proposed development has been determined to be appropriate for the proposed intended uses.

Mitigation and Residual Effects

- 8.122 As part of the Applicant's commitment to ensure an appropriate development response, the Applicant and its design team have developed a number of measures within the proposed development to ensure that the potential for significant adverse effects are avoided. These are discussed in the following paragraphs.

Demolition and Construction

- 8.123 Based on the demolition and construction dust assessment, the risk of dust impacts as a result of the proposed development is considered to be 'high' for dust soiling and 'high' to 'medium' for human health, without specific dust mitigation measures in place.
- 8.124 The effects prior to mitigation is likely to be substantial and significant for dust soiling and moderate and significant for health effects. Both these effects would be temporary and reversible.
- 8.125 In order to minimise any potential dust impacts, Table 8.20 summarises the mitigation measures which should be implemented at the application site.

Monitoring	<ul style="list-style-type: none"> Undertake daily on and off site visual inspections where there are nearby receptors. Carry out regular inspections to ensure compliance with the DMP and record results in the site log book. Increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather. Consider installing dust monitoring equipment at the site boundary to determine if incorporated mitigation measures are sufficient to manage dust emissions.
Preparing and Maintaining the Site	<ul style="list-style-type: none"> Plan site layout to locate dust generating activities as far as possible from receptors. Use solid screens around dusty activities and around stockpiles. Avoid site runoff of water and mud. Keep site fencing barriers and scaffolding clean using wet methods. Remove dusty materials from site as soon as possible. Minimise emissions from stockpiles by covering, seeding, fencing or damping down. Remove materials that have a potential to produce dust from the site as soon as possible, or cover if they are being reused on site. Enforce an on-site speed limit of 15mph on surfaced roads and 10mph on unsurfaced areas.
Operations	<ul style="list-style-type: none"> Cutting, grinding or sawing equipment only to be used with suitable dust suppression equipment or techniques. Ensure adequate water supply for effective dust and particulate matter suppression. Use enclosed chutes, conveyors and covered skips. Minimise drop heights of materials. Ensure suitable cleaning material is available at all times to clean up spills.
Measures Specific to Earthworks	<ul style="list-style-type: none"> Re-vegetate earthworks and exposed areas/soil stockpiles as soon as practicable. Use hessian, mulch or trackifiers where it is not possible to re-vegetate or cover with topsoil. Only expose small areas of ground or stockpile when working.
Measures Specific to Construction	<ul style="list-style-type: none"> Ensure aggregates are stored in bunded areas and are not allowed to dry out. Avoid concrete scabbling where possible. Ensure bulk cement and other fine powder is delivered in tankers and stored in silos with suitable emission control. Smaller supplies of fine powder material to be in sealed containers and stored appropriately.
Measures Specific to Trackout	<ul style="list-style-type: none"> Use water-assisted dust sweepers to clean access and local roads. Avoid dry sweeping of large areas. Ensure vehicles entering and leaving the site are appropriately covered. Implement a wheel washing system.

8.126 With these mitigation measures in place the residual effect for all sensitive receptors is likely to be reduced to Negligible and Not Significant for Dust Soiling and Health Effects.

8.127 The Peak Construction Traffic Assessment predicts Negligible changes in NO₂ and PM₁₀ concentrations at the existing sensitive receptors and therefore mitigation measures for construction traffic is not considered necessary.

Completed Development

8.128 No additional mitigation is proposed.

Summary of Mitigation and Residual Effects

8.129 Table 8.21 provide a tabulated summary of the mitigation measures required for the proposed development. Note this relates to the dust impacts only. Table 8.22 presents a summary of the residual effects.

Receptor	Description of Potential Effect	Proposed Mitigation & Enhancement Measures
Demolition and Construction		
Existing receptors	Nuisance Dust	Measures as detailed with Table 8.20.
New introduced receptors		

Receptor	Description of Residual Effect	Nature of Residual Effect*					
		Significance* *	+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction							
Existing Receptors	Dust Soiling and PM ₁₀ Health Effects	Negligible	n/a	I	T	R	ST
Existing Receptors	NO ₂ & PM ₁₀ effects due to vehicle emissions	No Change to Negligible	n/a	I	T	R	ST
Development Receptors	Dust Soiling and PM ₁₀ Health Effects	Negligible	n/a	I	T	R	ST
Completed Development							
Existing Receptors	NO ₂ & PM ₁₀ effects due to emissions	No Change to Negligible	n/a	I	P	R	LT
Development Receptors	NO ₂ , PM ₁₀ effects due to vehicle emissions and site suitability	Negligible	n/a	I	P	R	LT

Notes:

* - = Adverse/ + = Beneficial; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt –Medium term/ Lt –Long term.
**Negligible/Minor/Moderate/Major

8.130 It has also been determined that the application site is suitable for its intended uses in terms of air quality and odour.

Likely Significant Environmental Effects

8.131 During the demolition and construction phase, standard control measures which will be applied to the proposed development should reduce any potential effects of dust on any identified existing sensitive receptors and therefore these effects are not likely to be significant.

8.132 On completion of the proposed development, model predictions have shown that there will be no significant increase in pollutant concentrations to any identified existing or new sensitive receptors, and therefore no likely significant effects.

Cumulative Effects

Demolition and Construction

8.133 Should any closest permitted developments (Planning References 13/2016/F; 11/0868F; 14/2550/F and 16/0132/F) involve demolition or construction activities at the same time, any impacts on existing sensitive receptors will be managed appropriately through each individual scheme’s Construction Environmental Management Plan (which should form a planning condition to each consent) and are likely to be a temporary effect and negligible.

Completed Development

8.134 The traffic assessment has been undertaken in line with the EPUK & IAQM guidance³⁵. Based on this, cumulative traffic data from permitted developments have been included in the baseline 2023 scenario, in order to assess the impacts of the proposed development only, while also taking into account other developments in the area which could have an impact on the local air quality. These permitted developments are shown within Figure 2.1 in Chapter 2: EIA Process and Methodology.

8.135 No potential significant energy sources have been identified for the cumulative schemes that could impact the proposed development or existing sensitive receptors.

Air Quality Neutral

Transport Emissions

8.136 The air quality neutral assessment for Transport compares the road traffic emissions associated with the proposed development, which are based upon land use, the number of anticipated trips per year, and the average distance travelled per trip, against a calculated Transport Emissions Benchmark, which is based upon land use floor areas/number of dwellings of the proposed development and Inner London emission factors.

8.137 The predicted number of vehicle trips per year has been multiplied by the average distance travelled per trip, to obtain the total average distance travelled per year for the proposed development³⁸.

8.138 The emission factors taken from the guidance are 0.370 for NO_x and 0.0665 for PM₁₀. These emission rates are multiplied by the total average distance travelled per year to obtain the transport emissions for each land use and are then added together to obtain quantified Total Transport Emissions in Kg.

TRANSPORT EMISSIONS					
Parameter		C3	A1-A5	B1	D1-D2
		Residential	Retail	Office	Community and Leisure
A	GFA (m ²)		690	1560	1271
A	Dwellings	975			
B	Development annual trip rate per m ² or dwelling	239	3	1	1
C	Average distance travelled per trip (km)	3.7	5.9	7.7	5.9
D	NO _x emission factor (g/vkm)	0.370			
E	PM ₁₀ emission factor (g/vkm)	0.0665			
DEVELOPMENT NO_x EMISSIONS (kg/annum) [A*B*C*D] /1000		319.2	4.4	3.4	3.8
DEVELOPMENT PM₁₀ EMISSIONS (kg/annum) [A*B*C*E]/1000		57.4	0.8	0.6	0.7
G	TEB – NO _x emission (g/m ² /annum)		219	11.4	219
H	TEB – PM ₁₀ emission (g/m ² /annum)		39.3	2.05	39.3
G	TEB - NO _x emission (g/dwelling/annum)	558			
H	TEB - PM ₁₀ emission (g/dwelling/annum)	100			
TRANSPORT EMISSION BENCHMARK – NO_x emission (kg/annum) [G*A] /1000		544.1	151.1	17.8	278.3
TRANSPORT EMISSION BENCHMARK – PM₁₀ emission (kg/annum) [G*A] /1000		97.5	27.1	3.2	50.0

³⁸ Data provided by Transport Planning Practice Ltd.

TRANSPORT EMISSIONS				
Is the development NO _x emissions for transport above the benchmark?	NO	NO	NO	NO
Is the development PM ₁₀ emissions for transport above the benchmark?	NO	NO	NO	NO

Building Emissions

8.139 The air quality neutral assessment for the building compares the building related emissions against calculated benchmark values based upon floor space, land use and energy demand.

8.140 The Total Benchmarked Building Emissions for the proposed development are calculated using the floor area for each land-use class, multiplied by default emission benchmarks for each land-use category. Only emissions of NO_x are calculated as the CHP will be fuelled using natural gas rather than oil or solid fuel.

BUILDING EMISSIONS						
Parameter		C3	A1	B1	D1	D2
		Residen- tial	Retail	Office	Com- munity	Leisure
A	GFA (m ²)	61689*	690	1560	407	864
B	Energy Use – gas (kWh/annum)	3667880	8280	16640	28040	75270
C	NO _x emission factor (kg/kWh)	0.000785				
DEVELOPMENT NO_x EMISSIONS (kg/annum) [B*C]		287.9	1.6	3.2	5.4	14.6
D	Building Emission Benchmark NO _x (g/m ² /annum)	26.2	22.6	30.8	31.0	284.0
BUILDING EMISSION BENCHMARK – NO_x emission (kg/annum) [D*A] /1000		1611.7	15.6	48.0	12.6	245.4
Is the development NO _x emissions for buildings above the benchmark?		NO	NO	NO	NO	NO
*At the time of the assessment the residential GFA measured 61,517m ² , however it is considered that as it is an insignificant change this will not affect the outcome of the assessment.						