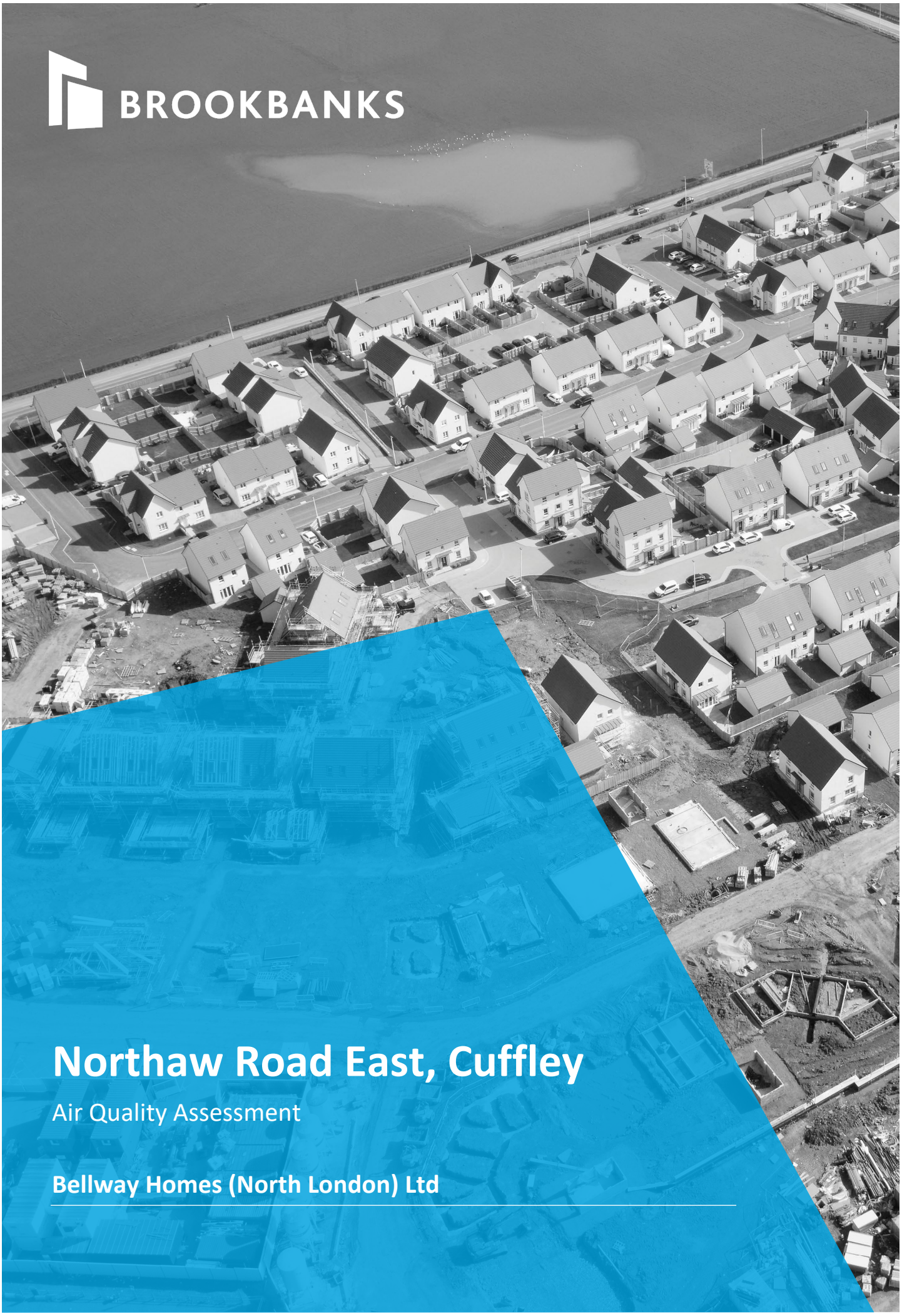
BROOKBANKS



# Northaw Road East, Cuffley

Air Quality Assessment

**Bellway Homes (North London) Ltd**

# Document Control Sheet

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# 1 Introduction

**1.1** Brookbanks Consulting Ltd is appointed by Bellway Homes (North London) Ltd to complete an air quality assessment for a proposed residential development on Northaw Road East, Cuffley. The location of the Proposed Development is presented in **Figure 1-1.** The site is not located within an Air Quality Management Area (AQMA).

**1.2** The proposed scheme comprises the approval of reserved matters (appearance, landscaping, layout, and scale) following outline planning permission S6/2015/1342/PP as varied by 6/2023/1352/VAR for residential development of 10 dwellings and associated infrastructure.

**1.3** This report presents the findings of a detailed assessment of the potential impacts of the Proposed Development on local air quality during construction and operation. It also assesses the suitability of the Site for residential development with regards to exposure of future occupants to elevated pollution concentrations and impacts of the operational phase on local air quality. For both the construction and operational phases of the development the type, source and significance of potential impacts are identified and the measures that should be employed to minimise any identified impacts and exposure to elevated pollution are described.

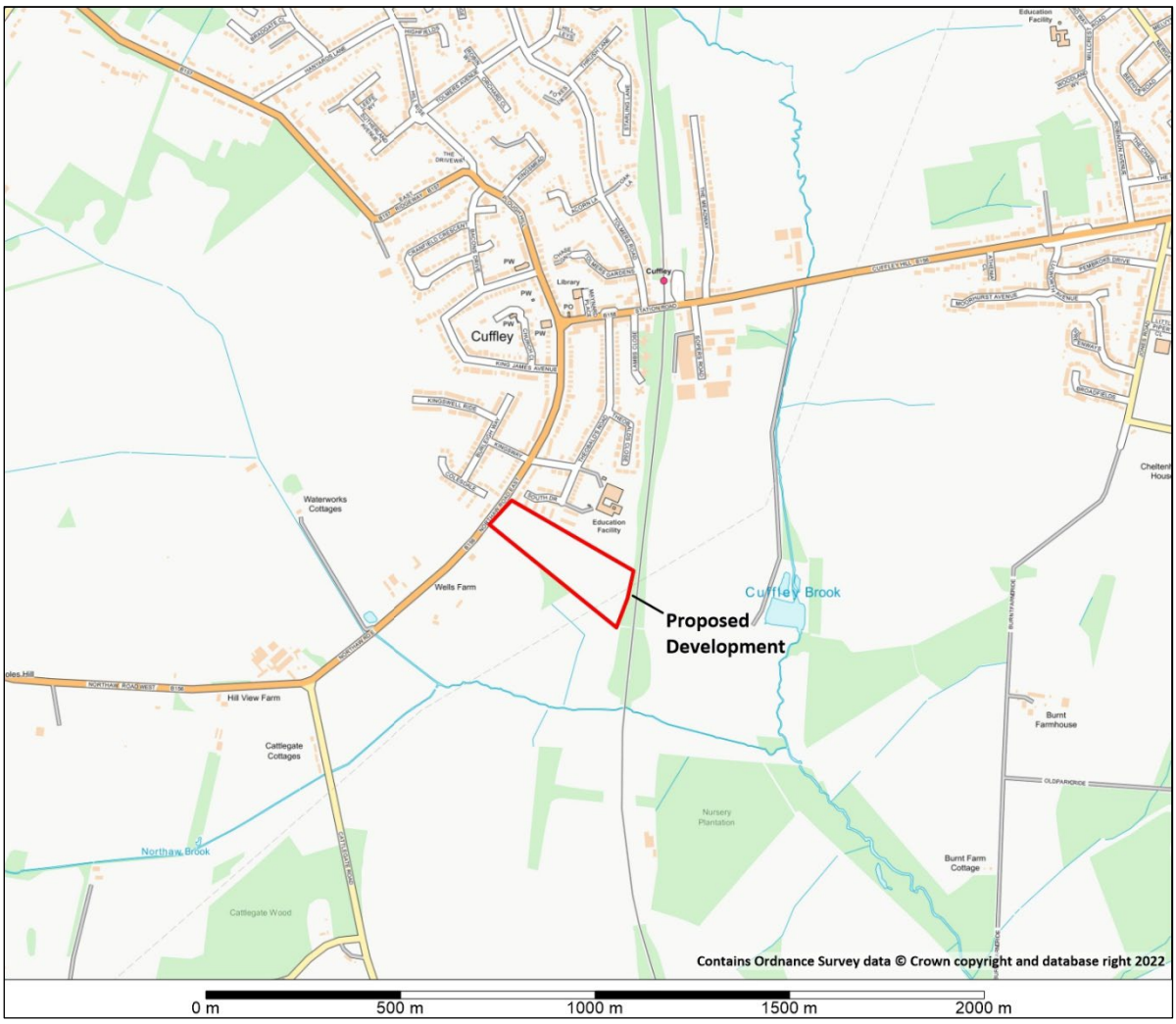


**Figure 1-1: Site Location**

# 2 Legislation and Policy

## Air Quality Strategy for England, Scotland, Wales & Northern Ireland

**2.1** The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) which was first published in July 2007[1], pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed. The most recent version of the AQS was published in April 2023 and updated in August 2023[2].

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

**2.3** The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g., children, the elderly and the unwell) might experience adverse health effects.

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

**2.5** For some pollutants there is both a long-term (annual mean) standard and a short-term standard. In the case of $NO_2$, the short-term standard is for a 1-hour averaging period, whereas for fine particulates ($PM_{10}$) it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g., temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

**2.6** Of the pollutants included in the AQS, $NO_2$, $PM_{10}$ and $PM_{2.5}$ will be particularly relevant to this project, as these are the primary pollutants associated with road traffic.

**2.7** It is widely accepted that there is no safe level for $PM_{2.5}$ and on this basis The Environment Act 2021[3] required the Air Quality Regulations[4] to be updated to include a more stringent long-term air quality target by the 31st October 2022. On 31st January 2023, the Government published an Environmental Improvement Plan[5], which includes an Annual Mean Concentration Target (AMCT) of 10 µg/m$^3$, to be achieved by the end of 2040. The Plan also includes an interim target of 12 µg/m$^3$, to be achieved by the end of January 2028. The 10 µg/m$^3$ target for $PM_{2.5}$ has been adopted into UK law via the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[6].

**2.8** A summary of the air quality standards that are relevant to the assessment, as set out in the as set out in the Air Quality Regulations (2010), the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023) and the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[7] is presented in **Table 2-1**.

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (July 2007)
[2] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (July 2023)
[3] Environment Act 2021
[4] The Air Quality Standards Regulations 2010
[5] Environmental Improvement Plan 2023, Defra, January 2023
6 Environmental Targets (Fine Particulate Matter) (England) Regulations 2023, Statutory Instrument 2023 No. 96
7 The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, Statutory Instrument 2020 No. 000

| Pollutant | Standard (µg/m$^3$) | Averaging Period | Comment |
|---|---|---|---|
| $NO_2$ | 40 | Annual | - |
| $NO_2$ | 200 | 1-Hour | Not to be exceeded more than 18 times per year. |
| $PM_{10}$ | 40 | Annual | - |
| $PM_{10}$ | 50 | 24-Hour | Not to be exceeded more than 35 times per year. |
| $PM_{2.5}$ | 20 | Annual | |
| $PM_{2.5}$ | 10 | Annual | Target to be achieved by 2040. |

**Table 2-1: Air Quality Standards for $NO_2$, $PM_{10}$ and $PM_{2.5}$**

## Local Air Quality Management (LAQM)

**2.9** Part IV of the Environment Act 1995 also requires local authorities to periodically review and assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

**2.10** Where any of the prescribed air quality objectives are not likely to be achieved, the authority concerned must designate that part an Air Quality Management Area (AQMA).

**2.11** For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

**2.12** The Department of Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their Review and Assessment work[8]. This guidance, referred to in this chapter as LAQM.TG16, has been used where appropriate in the assessment.

## The National Planning Policy Framework (NPPF)

[8] Department for Environment, Food and Rural Affairs (Defra), (2021): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG16

**2.13** The NPPF[9] sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

**2.14** The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to '*contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy*.'

**2.15** Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 180) requires that 'planning policies and decisions should contribute to and enhance the natural local environment by …preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible help to improve local environmental conditions such as air and water quality.'

**2.16** In dealing specifically with air quality the NPPF (paragraph 192) states that 'planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. As far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.'

**2.17** Paragraph 194 states that 'the focus of planning policies and decisions should be on whether Proposed Development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively.'

## Control of Dust and Particulates associated with Construction

**2.18** Section 79 of the Environmental Protection Act (1990) provides the following definitions of statutory nuisance relevant to dust and particulates:

- *'Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance'*
- *'any accumulation or deposit which is prejudicial to health or a nuisance'*

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

**2.20** In the context of the Proposed Development, the main potential for nuisance of this nature will arise during the construction phase - potential sources being the clearance, earthworks, construction and landscaping processes.

**2.21** There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist - 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates.

[9] Ministry of Housing, Communities and Local Government: National Planning Policy Framework , December 2023

## Welwyn Hatfield Local Plan 2016

**2.22** The Welwyn Hatfield Local Plan 2016[10] sets out the strategic framework for managing development in the area. With regard to air pollution, the plan states that **Policy SADM 18** 'Environmental Pollution' states that '*Prevailing air quality and potential impacts upon air quality arising from airborne emissions, dust and odour associated with the construction and the operation of a proposal (including vehicular traffic) will be considered when determining planning applications. Proposals that result in or be subject to unacceptable risk to human health and the natural environment from air pollution, or would prejudice compliance with national air quality objectives, will be refused.*

*An Air Quality Assessment that demonstrates how prevailing air quality and potential impacts upon air quality have been considered and how air quality will be kept to an acceptable standard through avoidance and mitigation will be required for major and minor development proposals that are:*

*i. Likely, due to the nature of the proposal to give rise to significant pollution;*

*ii. Within and Air Quality Management Area;*

*iii. Within 50m of a major road or heavily trafficked route;*

*iv. Within proximity to a source of air pollution which could present a significant risk to human health; and/or*

*v. Particularly sensitive to air pollution due to their nature, such as schools, health care establishments or housing for older people.*

*The potential impact of proposals upon odour levels, or their sensitivity to prevailing sources and levels of odour, should be considered and addressed. Where appropriate, the Council will require an Odour Impact Assessment to be provided, including an Odour Management Plan, where necessary.*'

[10] Welwyn Hatfield Local Plan 2016, Adopted October 2023

# 3 Methodology

## Scope of the Assessment

**3.1** The scope of the assessment has been determined in the following way:

- Review of development proposals in the context of the surrounding area;
- Review of air quality data for the area surrounding the Site and background pollutant maps;
- Review of the traffic flow data, which has been used as an input to the air quality modelling assessment.

**3.2** The development proposals will provide up to 121 dwellings; therefore, there is the potential for impacts on local air quality during both the construction and operational phases of the Proposed Development.

**3.3** Details of the assessment methodology and the specific issues considered are provided below.

## Construction Traffic

**3.4** During construction of the Proposed Development, lorries will require access to the Site to deliver and remove materials; earthmoving plant and other mobile machinery will work on site and generators and cranes will also be in operation. These machines produce exhaust emissions; of particular concern are emissions of $NO_2$ and particulate matter ($PM_{10}$ and $PM_{2.5}$).

**3.5** Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) air quality guidance sets out criteria to assist in establishing when an air quality assessment will be required. These criteria indicate that significant impacts on air quality outside an AQMA are unlikely to occur where a development results in less than 100 additional HGVs per day. Detailed information on the likely HGV trip generation during the construction phase is not currently available, however it is anticipated to be well below this level. On this basis the impact on air quality is expected to be negligible.

## Construction Dust

**3.6** To assess the potential impacts associated with dust and particulate matter releases during the construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the Institute of Air Quality Management (IAQM)[11] has been undertaken. A full description of the methodology is presented in Appendix A.

**3.7** This approach divides construction activities into the following four categories:

- demolition;
- earthworks;
- construction; and
- trackout.

**3.8** The assessment methodology requires consideration of dust effects arising from three potential impacts:

- annoyance due to dust soiling;
- harm to ecological receptors; and

[11] Institute of Air Quality Management (January 2024), Guidance on the Assessment of Dust from Demolition and Construction v.2.2

- the risk of health effects due to a significant increase in exposure to $PM_{10}$.

**3.9** The three impacts are assessed taking into account the sensitivity of the area likely to experience these effects, with the results of the assessment being used to define appropriate mitigation measures to prevent any significant effects at nearby receptors.

**3.10** The IAQM guidance sets out the assessment in a number of steps. The first is an initial screening procedure to determine where an assessment is required if:

- there are any sensitive 'human' receptors within 250 m of the site boundary or within 50m of the proposed construction haulage routes, up to 250m from the site entrance(s); or
- there are any sensitive 'ecological' receptors within 50 m of the site boundary or within 50m of the proposed construction haulage routes, up to 250m from the site entrance(s).

**3.11** Step 2 of the methodology assesses the risk of dust impacts for each construction activity and takes account of:

- the scale and nature of the works, which determines the potential dust emission magnitude (step 2a); and
- the sensitivity of the area (step 2b).

**3.12** 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. This assessment is based on both IAQM criteria and professional judgement.

**3.13** The outcome of the above two steps are then combined (step 2c) to identify the risk of dust impacts, which are described in terms of there being a low, medium or high risk of dust effects for each of the four activity groups and assuming no mitigation measures are in place.

**3.14** Based on the identified risk, appropriate mitigation measures are identified, as set out in the IAQM guidance.

**3.15** All construction sites are different and the potential for dust impacts are dependent on a number of local factors. The methodology set out in the IAQM guidance is therefore considered as a framework for assessing dust impacts and a certain level of professional judgement is required in determining the effects from each site.

**3.16** The significance of identified effects is evaluated post mitigation using professional judgement and assuming that the mitigation measures identified and set out within the assessment are implemented by way of a Dust Management Plan (DMP).

## Operational Traffic

**3.17** The Environmental Protection UK (EPUK) and IAQM planning guidance[12], states that for road links that are not within an AQMA, a detailed assessment of traffic-related impacts is required where:

- There is a change in the annual average daily traffic (AADT) flow of light goods vehicles (LGV) of more than 500 vehicles; and/or
- There is a change in the AADT flow of heavy goods vehicles (HGV) of more than 100 vehicles; and/or
- There is a change in the road re-alignment by more than 5m; and/or
- A new junction is introduced, which will significantly alter vehicle speeds.

**3.18** A summary of the operational AADT flows associated with the Proposed Development is presented in Table 3-1. The number of daily trips generated by the development falls below the IAQM/EPUK thresholds for a detailed assessment and therefore the impact of the operational traffic on local air quality is anticipated to be negligible.

[12] EPUK & IAQM (January 2017) Land-Use Planning & Development Control: Planning for Air Quality v1.2

| Road Link | Within AQMA? | LGV | HGV |
|---|---|---|---|
| Northaw Road East (South of site access) | × | 397 | 12 |
| Northaw Road East (North of site access) | × | 241 | 10 |

**Table 3-1: Operational Traffic Flows (AADT)**

## Exposure

**3.19** A review of recent air quality data from monitoring sites in Cuffley has been used to Development to determine whether mitigation will be required to protect future occupants from poor air quality.

# 4 Baseline Conditions and Exposure Assessment

## Local Review and Assessment of Air Quality

**4.1** Welwyn Hatfield District Council (WHDC) continually reviews and assesses air quality in their administrative area and produces annual status reports (ASRs), in accordance with the requirements of Defra.

**4.2** The results of routine air quality monitoring indicates that there are currently no exceedances of the air quality objectives in the District and to date, no AQMAs have been declared.

**4.3** The Proposed Development is approximately 1.2km north of the London Borough of Enfield which has a Borough-wide AQMA due to measured exceedances of the annual mean $NO_2$ objective and 24-hour mean $PM_{10}$ objective. Traffic associated with the Proposed Development will not adversely affect the Enfield AQMA.

## Local Air Quality Monitoring

**4.4** The primary source of $NO_2$, $PM_{10}$ and $PM_{2.5}$ emissions in the local area is road transport. Department for Transport data[13] shows that there was a significant drop in vehicle movements in Hertfordshire in 2020 due to restrictions imposed by the Government during the pandemic. Traffic levels gradually increased over 2021 and 2022, reaching close to pre-pandemic level in 2023 (see **Figure 4-1**).

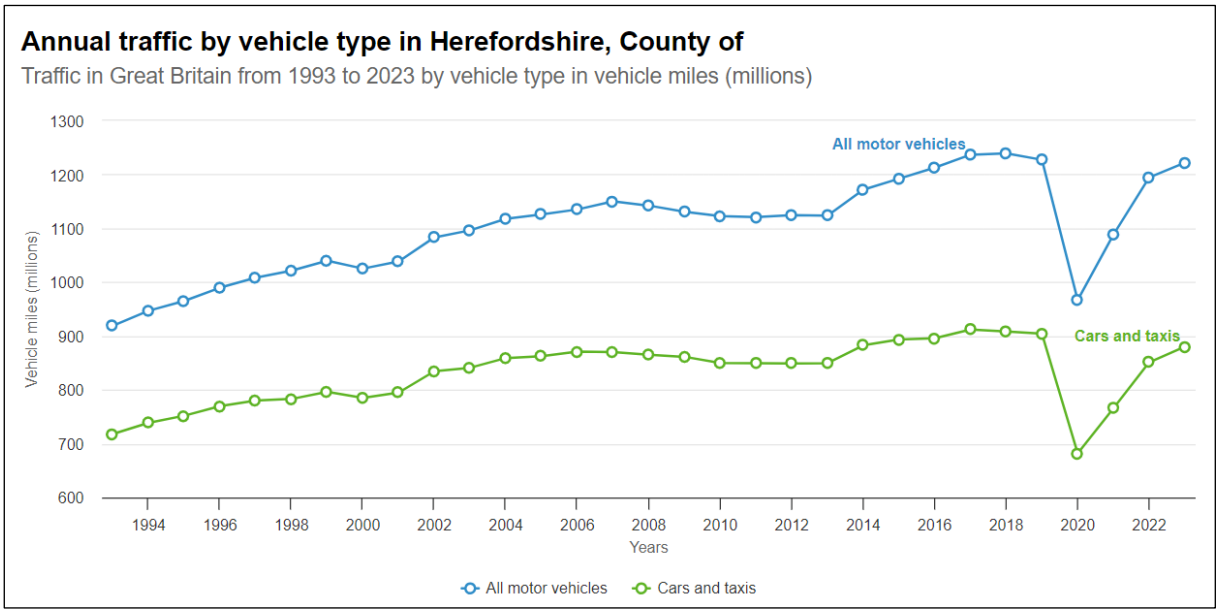


**Figure 4-1: Annual Traffic by Vehicle Type in Hertfordshire**

[13] https://roadtraffic.dft.gov.uk/local-authorities/155

**4.5** Ambient $NO_2$ concentrations are measured by WHDC via an extensive network of passive diffusion tubes. Details of the monitoring locations in Cuffley and bias adjusted annual mean concentrations measured between 2018 and 2022 are set out in Table 4-1 and Table 4-2 below. At the time of writing, WHDC are yet to publish their ratified 2023 data. The locations of the diffusion tubes are presented in Figure 4-2Table 4-1.

**4.6** The measured annual mean $NO_2$ concentrations in Cuffley are well within the air quality objective of 40 µg/m$^3$. The data for 2020 and 2021 shows the strong influence of the reduction in traffic due to the Covid-19 restrictions on pollution levels. However, despite the recovery in traffic levels, $NO_2$ concentrations in Cuffley remain well below pre-pandemic level. The highest concentrations are measured close to High Street where there is a steep hill on the approach to the junction with Northaw Road East. Concentrations measured close to Northaw Road East in 2022 less than 50% of the objective.

**4.7** It is not possible to monitor short-term $NO_2$ concentrations using diffusion tubes; however, research[14] has concluded that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations are below 60 µg/m$^3$. Based on the monitoring data presented in Table 4-2, an exceedance of the short-term objective is unlikely to occur in Cuffley.

| Site ID | Site Name | Type | Easting | Northing |
|---|---|---|---|---|
| WH5 | Cuffley High Street 1 | Roadside | 530553 | 202715 |
| WH6 | Cuffley High Street 2 | Roadside | 530502 | 202694 |
| WH15 | Cuffley High Street 3 | Roadside | 530439 | 202681 |
| WH30 | Northaw Road East | Roadside | 530424 | 202589 |

**Table 4-1: Diffusion Tube Monitoring Sites in Cuffley**

| Site | Type | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| WH5 | Roadside | 28.0 | 33.0 | 24.5 | 23.9 | 22.0 |
| WH6 | Roadside | 30.0 | 27.0 | 19.7 | 19.8 | 18.8 |
| WH15 | Roadside | 21.0 | 20.0 | 14.0 | 18.8 | 17.7 |
| WH30 | Roadside | 23.0 | 21.0 | 18.4 | 17.1 | 16.6 |

**Table 4-2: Annual Mean $NO_2$ Concentrations Measured by Diffusion Tube (µg/m$^3$)**

[14] D. Laxen and B Marner (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites.

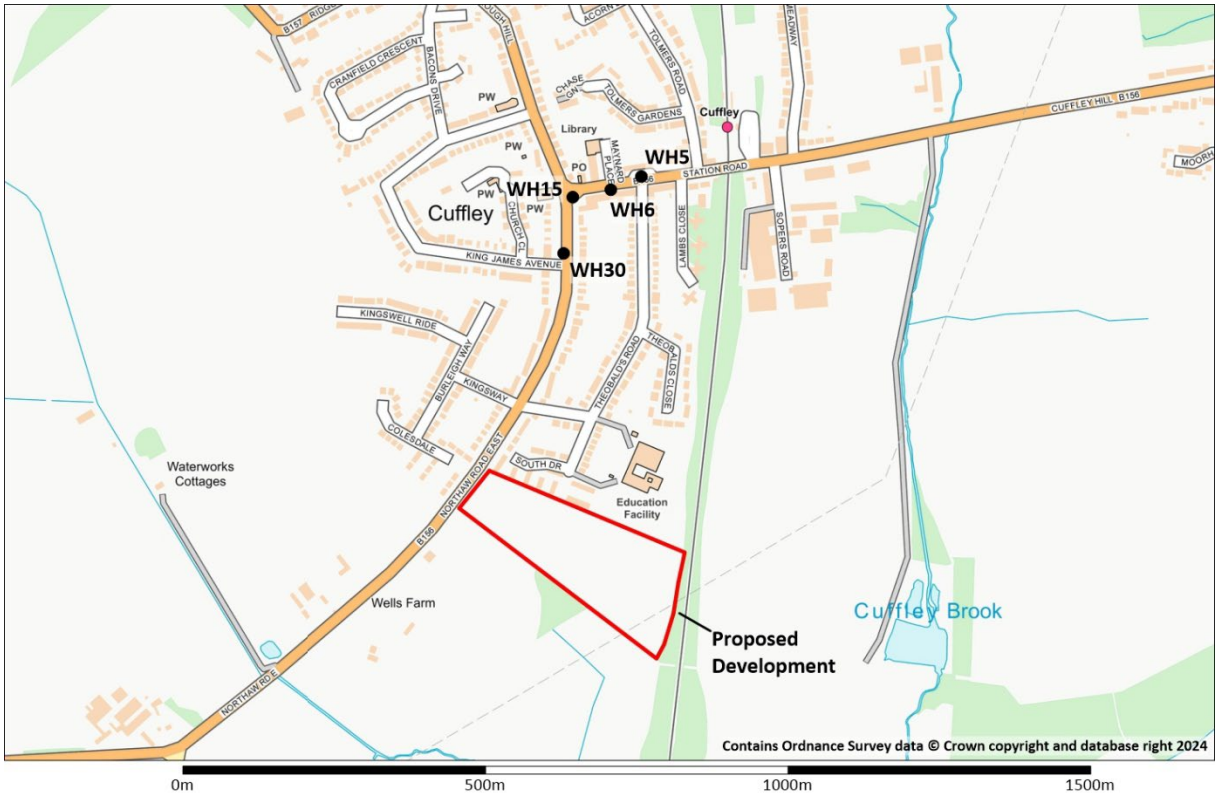


**Figure 4-2: Diffusion Tube Monitoring Locations**

## Defra Background Maps

**4.8** There are no local $PM_{10}$ or $PM_{2.5}$ monitoring sites, therefore Defra background mapped data[15] have been used to provide an indication of existing concentrations at the Proposed Development. These 1 km grid resolution maps are derived from a complex modelling exercise that takes into account emissions inventories and measurements of ambient air pollution from both automated and non-automated sites. The latest background maps were issued in August 2020 and are based on 2018 monitoring data.

**4.9** The maximum 2022 annual mean background $NO_2$, $PM_{10}$ and $PM_{2.5}$ concentrations at the Proposed Development have been determined from contour plots of the mapped data and are presented in Table 4-3. The mapped concentrations for all three pollutants are well within the relevant long-term air quality standards.

**4.10** The mapped $PM_{2.5}$ concentration is slightly higher than the proposed new concentration target of 10 µg/m$^3$. However, the continued uptake of electric vehicles together with more stringent emissions standards for key sources of $PM_{2.5}$, such as domestic wood burning stoves, should lower the background concentration to a level that is below the target prior to the proposed compliance date of 2040.

[15] https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

| Pollutant | Annual Mean | Air Quality Standard |
|---|---|---|
| $NO_2$ | 13.2 | **40** |
| $PM_{10}$ | 16.8 | 40 |
| $PM_{2.5}$ | 11.3 | 25 |

**Table 4-3: 2022 Mapped Background Concentrations (µg/m$^3$)**

## Potential Exposure

4.11 The Proposed Development is located on the southern edge of Cuffley and based on $NO_2$ diffusion tube monitoring carried out along the B156 in the village, concentrations at the Site will be well below both the annual mean and 1-hour objectives for $NO_2$.

**4.12** The Defra mapped background $PM_{10}$ and $PM_{2.5}$ concentrations at the Proposed Development are well within the current air quality objectives. Whilst the particulate concentrations close to the roadside are likely to be higher than the background, based on the mapped data the concentrations will be well within the relevant long and short-term air quality standards at all locations on-site

**4.13** The Proposed Development is approximately 330m north of an anaerobic digestion plant and composting facility Detailed dispersion modelling was undertaken[16] in support of the planning application for the facility, which predicted a worst case odour impact of between 0.7 and 1.3 $OU_E$ at receptors in the vicinity of the proposed development (e.g., Cuffley School, tennis courts).

**4.14** The Environment Agency's odour guidance note H4 – Odour Management[17], which notes that 5 $OU_E/m^3$ would be a "faint" odour whilst 10 $OU_E/m^3$ would be considered a "distinct" odour. Generally, an average person would be able to recognise the source of an odour at about 3 $OU_E/m^3$ although this can depend on the relative offensiveness of the odour.

**4.15** Since the maximum predicted odour impact in the vicinity of the proposed development is 1.3 $OU_E$, it is considered unlikely that residents of the Proposed Development would be significantly affected by odour generated by the facility.

**4.16** The Proposed Development will not therefore introduce new exposure to poor air quality.

[16] Odour Impact Assessment for Proposed Anaerobic Digestion Plant and Proposed Green Waste Compost Operation at Cattlegate Farm, Cattlegate Road, Enfield, Middlesex, The Airshed (AS 0285 Cattlegate AD), July 2011.

[17] Environment Agency (March 2011), Horizontal Guidance Note H4, Odour Management

# 5 Assessment of Impact

## Construction Dust Impacts

**5.1** The Site is a large agricultural field situated on the southern side of Cuffley, adjacent to an existing residential area and sports facility. Cuffley Primary School is approximately 70 m from the site boundary. There are no buildings on the Site that will require demolition, therefore impacts associated with demolition activities have not been considered within this report.

**5.2** Based on the IAQM guidance, sensitive receptors that may be affected by dust emissions during construction activities include residential properties, educational facilities, retail premises, places of work, recreational areas and ecological receptors. The nearest residential receptors are to the north along South Drive and to the west on Colesdale. An assessment of construction related impacts in relation to human receptors is therefore considered necessary. There are over ten existing properties within 20m of the site boundary and occupants of early phases may also be affected by dust generated by later phases. Therefore, in accordance with the guidance, the area is of 'high' sensitivity to dust soiling impacts.

**5.3** Dust emissions from construction activities are unlikely to result in significant impacts on ecologically sensitive receptors beyond 50 m from the site boundary. There are no designated habitat sites within 50 m of the site boundary therefore the risk of impacts on ecological receptors is negligible and has not been considered any further within this assessment.

**5.4** As detailed in Section 4, $PM_{10}$ concentrations are not monitored locally. Data presented in Table 4-3 indicates background concentrations in the region of 17 µg/m$^3$. Based on professional experience, $PM_{10}$ concentrations at roadside locations are unlikely to be more than a few µg higher than background concentrations and therefore concentrations in the vicinity of the Site are therefore expected to be less than 24 µg/m$^3$ (the lowest threshold for potential health impacts in the guidance) and the sensitivity of the area to health impacts from dust is considered to be 'low'.

**5.5** The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

**5.6** A wind rose from Luton Airport Meteorological Station is provided below in Figure 5-1, which shows that the prevailing wind is from the south and southwest. Properties located to the north and northeast are therefore most likely to be affected by dust generated by construction activities.

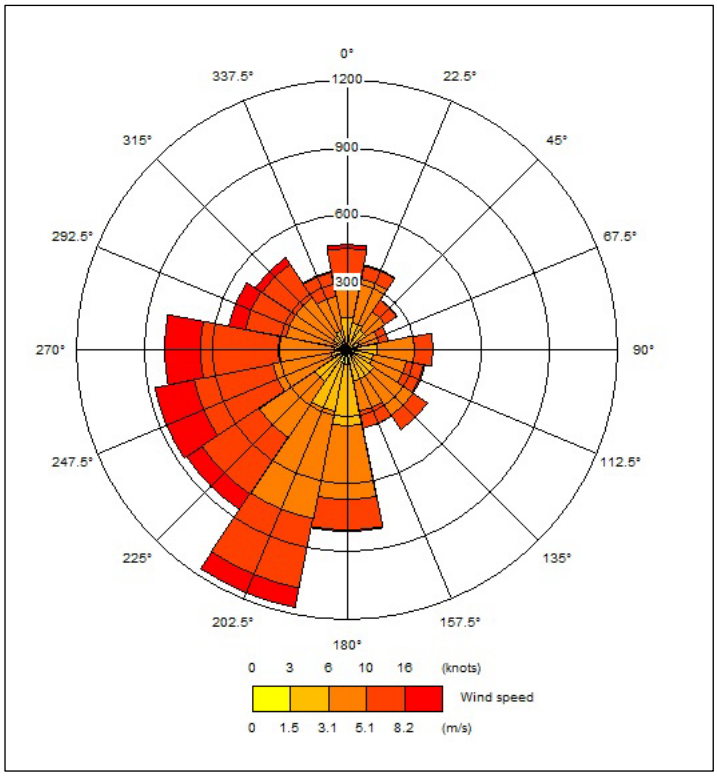


**Figure 5-1: Wind Rose Luton Airport 2019**

**5.7** The dust emission magnitude is based on the scale of anticipated works at the Site and has been defined as small, medium or large for each of the three activities; earthworks, construction and trackout.

- Earthworks - Earthworks are those activities involved in preparing the Site for construction such as excavation of material, haulage, tipping, stockpiling and levelling. The Site covers an area of over 18,000 $m^2$, and it is anticipated that there will be more than 10 earth moving vehicles operating on site at any one time. In addition, based on the size of the site, there is the potential for material to be stored on site in large bunds (> 6 m in height). The magnitude of the dust emission is therefore considered to be 'large' with regards to earthworks activities.
- Construction - There are a number of issues that can impact the dust emission class during construction activities including the size of the building, materials used for construction, the method of construction and the duration of the build. Based on the current design layout the total building volume proposed for the Site is anticipated to be around 75,000 $m^3$. Detailed information regarding the construction phase is not available, however it is anticipated that a significant proportion of the material used would be brick and concrete, which are potentially dusty materials. It is also possible that concrete batching may be undertaken on site. The magnitude of the dust emissions during the construction phase is therefore considered to be 'large.'
- Trackout - The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors that are used to determine the emission class of the Site as a result of trackout. Factors influencing the degree of trackout and associated magnitude of effect include vehicle size, vehicle speed, vehicle numbers, geology and duration. Construction traffic will access the site via Northaw Road East, where there are existing residential properties within 10m of the carriageway. Due to the relatively large size of the Site there is the potential for up to 50 HGV movements per day over potentially lengthy unpaved haul roads. The dust emission magnitude due to trackout is considered to be 'large'.

**5.8** The dust emission magnitude is combined with the 'high' sensitivity of the area to dust soiling impacts and 'low' sensitivity to health impacts, to determine the risk impacts assuming no mitigation measures have been applied at the Site. The risk of impacts associated with each activity is provided in Table 5-1 below and has been used to identify specific mitigation measures for the construction phase.

| Source | Emission Magnitude | Risk of Health Impacts | Risk of Dust Soiling Impacts |
|---|---|---|---|
| Earthworks | Large | Low | High |
| Construction | Large | Low | High |
| Trackout | Large | Low | High |

**Table 5-1: Risk of Dust Impacts Prior to Mitigation**

# 6 Mitigation

## Construction Phase

**6.1** The risk of dust soiling and human health impacts from the site has been assessed as high, prior to mitigation. In accordance with the IAQM guidance, the 'highly recommended' mitigation measures detailed in Table 6-1 should be incorporated into a Dust Management Plan or Construction Environmental Management Plan for the Proposed Development.

**6.2** The significance of dust impacts on nearby receptors following the implementation of appropriate and best practice mitigation is considered to be negligible.

| Category | Measure |
|---|---|
| General | • Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.<br>• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site Manager.<br>• Display the head or regional office contact information. |
| Site management | • Record all dust and air quality complaints, identify cause(s), act appropriately to reduce emissions in a timely manner, and record the measures taken.<br>• Make the complaints log available to the local authority when asked.<br>• Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.<br>• Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes. |
| Monitoring | • Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary.<br>• Carry out regular site inspections to monitor compliance with the DMP or CEMP. Record inspection results and make an inspection log available to the local authority when asked.<br>• Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. |

| | |
|---|---|
| | • Agree dust deposition, dust flux, or real-time $PM_{10}$ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. |
| Preparing and maintaining the site | • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.<br>• Erect solid screens or barriers around dusty activities or at the site boundary that are at least as high as any stockpiles on site.<br>• Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.<br>• Avoid site runoff of water or mud.<br>• Keep site fencing, barriers and scaffolding clean using wet methods.<br>• Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.<br>• Cover, seed or fence stockpiles to prevent wind whipping. |
| Operating vehicle/machinery and sustainable travel | • Ensure all vehicles switch off engines when stationary - no idling vehicles.<br>• Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.<br>• Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).<br>• Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.<br>• Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing). |
| Operations | • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems.<br>• Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.<br>• Use enclosed chutes and conveyors and covered skips.<br>• Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.<br>• Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. |
| Waste management | • Avoid bonfires and burning of waste materials |

| | |
|---|---|
| Construction | • Avoid scabbling (roughening of concrete surfaces) if possible<br>• Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.<br>• Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. |
| Trackout | • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.<br>• Avoid dry sweeping of large areas.<br>• Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.<br>• Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.<br>• Record all inspections of haul routes and any subsequent action in a site logbook.<br>• Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.<br>• Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).<br>• Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.<br>• Access gates to be located at least 10 m from receptors where possible. |

**Table 6-1: Highly Recommended Mitigation Measures**

## Operational Phase

**6.3** Local air quality monitoring data indicates that roadside concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ in Cuffley are well within the air quality objectives. On this basis, future occupants will not be exposed to poor air quality and on-site mitigation will not be required.

**6.4** In accordance with the IAQM/EPUK screening criteria, traffic generated by the Proposed Development during the operational phase will not significantly affect local air quality, however the development will implement a site wide Travel Plan (TP) which would incorporate measures aimed at reducing reliance on the use of private vehicles by encouraging the use of alternative modes such as cycling, walking and public transport.

# 7 Residual Effects

## Construction Phase

**7.1** The residual effects of dust and particulate matter generated by construction activities will be minimised by following the mitigation measures outlined within this appraisal. The residual effects are therefore considered to be negligible.

## Operational Phase

**7.2** The residual impact of the Proposed Development on local air quality is considered to be negligible.

# 8 Conclusions

**8.1** An air quality impact assessment has been carried out to assess both construction and operational impacts of the Proposed Development.

**8.2** During the construction phase of the Proposed Development, releases of dust and $PM_{10}$ are likely to arise from site activities. Through good site practice and the implementation of suitable mitigation measures, the impact of dust and $PM_{10}$ releases may be effectively mitigated, and the resultant impacts are considered to be negligible

**8.3** In accordance with the IAQM/EPUK screening criteria, the impact of the construction and operational phase traffic is expected to be negligible.

**8.4** A review of local air quality monitoring data indicates that existing concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ in Cuffley are well within the relevant long and short-term objectives, therefore the Proposed Development will not introduce new exposure to poor air quality.

# 9 Limitations

**9.1** The conclusions and recommendations contained herein are limited to those given the general availability of background information and the planned usage of the Site.

**9.2** Third Party information has been used in the preparation this report, which Brookbanks Consulting Ltd, by necessity assumes is correct at the time of writing. While all reasonable checks have been made on data sources and the accuracy of data, Brookbanks Consulting Ltd accepts no liability for the same.

**9.3** The benefits of this report are provided solely to Bellway Homes (North London) Ltd. for the proposed development on the Site only.

**9.4** Brookbanks Consulting Ltd excludes third party rights for the information contained in the report.

# Appendix A – Construction Dust Risk Assessment Methodology

Factors defining the sensitivity of a receptor to dust impacts are presented in Table A1.

| Pollutant | Human Health | Dust Soiling | Ecological |
|---|---|---|---|
| High | - Locations where members of the public are exposed over a time period relevant to the air quality objective for $PM_{10}$ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) (a)<br>- Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment. | - Users can reasonably expect enjoyment of a high level of amenity; or<br>- The appearance, aesthetics or value of their property would be diminished by soiling; and<br>- The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.<br>- Indicative examples include dwellings, museums and other culturally important collections, medium- and long-term car parks and car showrooms | - Locations with an international or national designation and the designated features may be affected by dust soiling; or<br>- Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain (g).<br>- Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings. |
| Medium | - Locations where the people exposed are workers (b), and exposure is over a time period relevant to the air quality objective for $PM_{10}$ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).<br>- Indicative examples include office and shop workers, but will | - Users would expect (d) to enjoy a reasonable level of amenity, but would not reasonably expect (d) to enjoy the same level of amenity as in their home; or<br>- The appearance, aesthetics or value of their property could be diminished by soiling; or<br>- The people or property wouldn't reasonably be expected (d) to be present here continuously or | - Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or<br>- Locations with a national designation where the features may be affected by dust deposition.<br>- Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features. |

| | | | |
|---|---|---|---|
| | generally not include workers occupationally exposed to $PM_{10}$, as protection is covered by Health and Safety at Work legislation | regularly for extended periods as part of the normal pattern of use of the land.<br>- Indicative examples include parks and places of work. | |
| Low | - Locations where human exposure is transient (c)<br>- Indicative examples include public footpaths, playing fields, parks and shopping streets. | - The enjoyment of amenity would not reasonably be expected (d); or<br>- Property would not reasonably be expected (d) to be diminished in appearance, aesthetics or value by soiling; or • there is transient exposure, where the people or property would reasonably be expected (d) to be present only for limited periods of time as part of the normal pattern of use of the land.<br>- Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short-term car parks (e) and roads. | - Locations with a local designation where the features may be affected by dust deposition.<br>- Indicative example is a local Nature Reserve with dust sensitive features. |

(a) This follows Defra guidance as set out in LAQM.TG22.

(b) Notwithstanding the fact that the air quality objectives and limit values do not apply to people in the workplace, such people can be affected to exposure of $PM_{10}$. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers. For this reason, workers have been included in the medium sensitivity category.

(c) There are no standards that apply to short-term exposure, e.g., one or two hours, but there is still a risk of health impacts, albeit less certain.

(d) People's expectations will vary depending on the existing dust deposition in the area.

(e) Car parks can have a range of sensitivities depending on the duration and frequency that people would be expected to park their cars there, and the level of amenity they could reasonably expect whilst doing so. Car parks associated with workplace or residential parking might have a high level of sensitivity compared to car parks used less frequently and for shorter durations, such as those associated with shopping. Cases should be examined on their own merits.

(f) The advice of an ecologist should be sought to determine the need for an assessment of dust impacts on sensitive habitats and plants. A Habitat Regulation Assessment of the site may be required as part of the planning process, if the site lies close to an internationally designated site i.e., Special Conservation Areas (SACs), Special Protection Areas (SPAs) designated under the Habitats Directive (92/43/EEC) and RAMSAR sites.

(g) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.

**Table A1: Receptor Sensitivity**

The sensitivity of the area as a whole is dependent on the number of receptors within each sensitivity class and their distance from the source. Human health impacts are also dependent on the existing PM10 concentrations in the area.

Table A2 and Table A3 summarise the criteria for determining the overall sensitivity of the area to dust soiling and health impacts, respectively. The sensitivity of the area to ecological impacts is presented in Table A4.

| Receptor Sensitivity | Number of Receptors | Distance from the Source (m) | | | |
|---|---|---|---|---|---|
| | | <20 | <50 | <100 | <250 |
| High | >100 | High | High | Medium | Low |
| | 10-100 | High | Medium | Low | Low |
| | 1-10 | Medium | Low | Low | Low |
| Medium | >1 | Medium | Low | Low | Low |
| Low | >1 | Low | Low | Low | Low |

**Table A2: Sensitivity of the Area to Dust Soiling Effects on People and Property**

| Receptor Sensitivity | Annual Mean $PM_{10}$ Concentration ($\mu g/m^3$) | Number of Receptors | Distance from the Source (m) | | | |
|---|---|---|---|---|---|---|
| | | | <20 | <50 | <100 | <250 |
| High | <32 | >100 | H | H | H | M |
| | | 10-100 | H | H | M | L |
| | | 1-10 | H | M | L | L |
| | 28 – 32 | >100 | H | H | M | L |
| | | 10-100 | H | M | L | L |
| | | 1-10 | H | M | L | L |
| | 24 - 28 | >100 | H | M | L | L |
| | | 10-100 | H | M | L | L |
| | | 1-10 | M | L | L | L |
| | <24 | >100 | M | L | L | L |
| | | 10-100 | L | L | L | L |
| | | 1-10 | L | L | L | L |

| | | | | | | |
|---|---|---|---|---|---|---|
| Medium | <32 | >10 | H | M | L | L |
| | | 1-10 | M | L | L | L |
| | 28 – 32 | >10 | M | L | L | L |
| | | 1-10 | L | L | L | L |
| | 24 - 28 | >10 | L | L | L | L |
| | | 1-10 | L | L | L | L |
| | <24 | >10 | L | L | L | L |
| | | 1-10 | L | L | L | L |
| Low | - | >1 | L | L | L | L |

**Table A3: Sensitivity of the Area to Health Impacts from Dust (H = High, M = Medium, L = Low)**

| Receptor Sensitivity | Distance from the Source (m) | |
|---|---|---|
| | **<20** | **<50** |
| High | H | M |
| Medium | M | L |
| Low | L | L |

**Table A4: Sensitivity of the Area to Ecological Effects**

The magnitude of the dust impacts for demolition, earthworks, construction and trackout is classified as small, medium or large depending on the scale of the proposed works as detailed in Table A5.

| Source | Large | Medium | Small |
|---|---|---|---|
| Demolition | Total building volume >75,000m$^3$.<br>Potentially dusty material (e.g., concrete).<br>Onsite crushing and screening<br>Demolition activities >12m above ground level. | Total building volume 12,000 - 75,000m$^3$.<br>Potentially dusty material<br>Demolition activities 6 - 12m above ground level. | Total building volume <12,000m$^3$.<br>Construction material with low potential for dust release.<br>Demolition activities <6m above ground level.<br>Demolition during wetter months. |
| Earthworks | Total site area >110,000m$^2$<br>Potentially dusty soil. type (e.g., clay).<br>>10 heavy earth moving vehicles active at any one time.<br>Formation of bunds >6m in height. | Total site area 18,000 - 110,000m$^2$.<br>Moderately dusty soil type (e.g., silt).<br>5-10 heavy earth moving vehicles active at any one time.<br>Formation of bunds 3 - 6m in height. | Total site area <18,000m$^2$.<br>Soil type with large grain size (e.g., sand).<br><5 heavy earth moving vehicles active at any one time.<br>Formation of bunds <3m in height |

| | | | |
|---|---|---|---|
| | Total material moved >100,000 tonnes. | | |
| Construction | Total building volume >75,000m$^3$.<br>On site concrete batching.<br>Sandblasting. | Total building volume 12,000 - 75,000m$^3$.<br>Potentially dusty construction material (e.g., concrete).<br>On site concrete batching. | Total building volume <12,000m$^3$.<br>Material with low potential for dust release (e.g., metal cladding or timber). |
| Trackout | >50 HGV movements in any one day (a).<br>Potentially dusty surface material (e.g., high clay content).<br>Unpaved road length >100m. | 20 - 50 HGV movements in any one day (a).<br>Moderately dusty surface material (e.g., silt).<br>Unpaved road length 50 - 100m. | <20 HGV movements in any one day (a).<br>Surface material with low potential for dust release.<br>Unpaved road length <50m. |
| (a) HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes. | | | |

**Table A5: Dust Emission Magnitude**

For each dust emission source, the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts prior to mitigation as illustrated in Tables A6 and A8.

| Area Sensitivity | Distance from the Source (m) | | |
|---|---|---|---|
| | **Large** | **Medium** | **Small** |
| High | High Risk | Medium Risk | Medium Risk |
| Medium | High Risk | Medium Risk | Low Risk |
| Low | Medium Risk | Low Risk | Negligible Risk |

**Table A6: Risk of Dust Impacts from Demolition**

| Area Sensitivity | Distance from the Source (m) | | |
|---|---|---|---|
| | **Large** | **Medium** | **Small** |
| High | High Risk | Medium Risk | Low Risk |
| Medium | Medium Risk | Medium Risk | Low Risk |
| Low | Low Risk | Low Risk | Negligible Risk |

**Table A7: Risk of Dust Impacts from Earthworks, Construction and Trackout**

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