# AIR QUALITY ASSESSMENT

**Land at Burleigh Lane**
Crawley Down
West Sussex
RH10 4LF

**Prepared For:**
**Burleigh Lane Crawley Down Ltd.**
85 Great Portland Street
London
W1W 7LT

**EPS Project Reference:** UK25.7341

**Date Issued:** 28th March 2025
(re-issued with updated development plan 6th June 2025)

**Report Status:** Issue 1.1

## LAND AT BURLEIGH LANE, CRAWLEY DOWN

### NON-TECHNICAL CLIENT SUMMARY

The purpose of this report is to qualitatively review air quality around Land at Burleigh Lane, Crawley Down, assess whether any new risks will be introduced by a proposed residential development and then outline possible measures which can minimise any harmful emissions.

- The area surrounding the site has good air quality with no declared management areas by Mid Sussex District Council requiring improvement. A qualitative Simple Air Quality Impact Assessment has been carried out to review the potential impacts on future residents of the development, as well as people living and working in the nearby area.
- Currently, the site comprises undeveloped grassland with some established trees and vegetation. The development is understood to comprise the construction of 49 residential dwellings with associated garden areas and vehicle parking.
- A 'slight adverse' impact has been identified during the construction phase with some dust expected; however, these impacts can be managed through good site practices and the implementation of a Dust Management Plan or Construction Environmental Management Plan. Provided the dust emission mitigation measures included in this report are undertaken, the impact can be considered to be negligible.
- A 'slight adverse' impact has been assigned during the operational phase as the development itself could introduce some new sources of pollution mainly to the area around the new access point, however, Crawley Down currently has good air quality so this shouldn't be a particular issue or barrier to the development. There does not appear to be any need for further modelling or monitoring to assess the potential impacts on local air quality and there is no obvious reason for not proceeding with the proposed development on this basis, either in terms of risks posed to existing residents nearby or the future users of the site from poor air quality.
- The incorporation of Low Emission Design into both phases of the development is still encouraged at this early stage as described in this report. This report can be updated as layouts become finalised and EPS would welcome input from all stakeholders, including the project team as to how value could be added to the scheme in this regard. Sussex Council's require an Emissions Mitigation Assessment to formalise what specific measures (with a defined monetary value) will be incorporated into the scheme which EPS can prepare when the relevant design details become available.

By their very nature, the above bullet points represent a simplified summary of our work and should not be relied upon to form the basis for key decisions for the proposed development. A full picture is provided in the following report, or alternatively give us a call and we'll talk you through it.

| | |
|---|---|
| **Project Reference:** | UK24.7044 |
| **Title:** | Air Quality Assessment |
| **Client:** | Burleigh Lane Crawley Down Ltd |
| **Date:** | 28th March 2025 (re-issued with updated development plan 6th June 2025) |
| **EPS Contact Details:** | 7B Caxton House<br>Broad Street<br>Cambourne<br>Cambridge CB23 6JN<br><br>T: 01954 710666<br>E: info@epstrategies.co.uk<br>W: www.epstrategies.co.uk |
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| **Author:** | **Reviewed:** | **Authorised:** |
|---|---|---|
| *M Bell* | *J Bowley* | *M Bell* |
| Marcus Bell | James Bowley | Marcus Bell |
| Director | Senior Consultant | Director |

**Limitations & Constraints**

This report has been prepared for the client(s) listed on the report title page. EPS accepts no liability or responsibility for use of, or reliance upon, this report and / or the information contained within it by third parties.

If third parties have been contracted / consulted during compilation of this report, the validity of any data they may have supplied, and which are included in the report, have been assessed as far as possible by EPS however, EPS cannot guarantee the validity of these data.

Where air quality data has been referenced and used to inform the assessment, there may be factors which have influenced the gathering of that data that resulted in it not being fully representative of the air quality in that specific location. Multiple lines of evidence are used to inform the outcomes of the assessment to reduce uncertainty and to avoid over-reliance on any single piece of data.



The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' in house quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

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**Appendices**

# 1 INTRODUCTION

In March 2025, Environmental Protection Strategies Ltd (EPS) was commissioned by Merrow Wood on behalf of Burleigh Lane Crawley Down Ltd to complete an Air Quality Assessment for the proposed development at Land at Burleigh Lane, Crawley Down, West Sussex ('the site').

The work was commissioned in order to fulfil future planning requirements relating to air quality for the construction of 49 residential dwellings with associated garden areas and vehicle parking. Under the NPPF[1a] principle EPUK & IAQM[2a] guidance, this scheme likely fulfils criteria for undertaking an air quality impact assessment due to the size of the proposed development, although there is currently no active planning application or formal regulatory requirement and the design is at an early stage.

(–) See Appendix A for full references

The key purpose of this report is to provide an initial overview of potential air quality impacts associated with the development, identify any need for further work and give an outline of low emission measures which could be incorporated to minimise harmful air pollution and carbon emissions, as well as outline future compliance with local mitigation requirements set out by the Sussex Councils.

## 1.2 Context for the Assessment

The development at Land at Burleigh Lane, Crawley Down, West Sussex is currently at an early stage and this report is intended to support the planning application process. It is highly beneficial to raise the low emission design considerations at the earliest opportunity in the design process and the low emissions design component of this report is therefore intended to identify areas which are likely to yield the greatest benefits and may be viable for incorporation into the scheme so that relevant stakeholders can be engaged where appropriate to deliver these outcomes.

The site currently consists of undeveloped grassland, some disused agricultural buildings with trees and shrubs. In most cases where land is being brought back into use, or for a more intensive use, there will likely be an adverse impact on local air quality ranging from negligible to substantially adverse taking into account conventional traffic movements, energy generation and the built environment. It is usually not possible to improve existing air quality by undertaking new conventional development, so in that context, the objective will be to minimise any additional emissions.

## 1.3 Background to Approach

A Simple Air Quality Impact Assessment (AQIA) is included within this report. It is qualitative (i.e. 'Simple') in nature and does not involve any numerical modelling or quantitative element, which may be required at a later stage. EPS encourage the adoption of mitigation through the inclusion of appropriate low emission measures (which would be the intention regardless of the assessment's conclusion), and relevant details are included within this report.

It is a recognised shortcoming of the air quality assessment process that when typical AQIA's simply relate the predicted or modelled significance of impacts during construction and operational phases to nationally prescribed air quality pollutant limit values, the need for mitigation is invariably not identified. This was not the overarching intention of trying to reduce air pollution (or wider carbon emissions) through the planning system.

The basis for a conventional AQIA is to review the existing (baseline) conditions and then predict the future conditions with and without the development. Just adopting the current 'baseline' as a justification for 'do nothing' is often not particularly sustainable. This issue has been highlighted at a national level, in 2014-15, DEFRA consulted on the proposed overhaul of the regime, stating within their Impact Assessment:

*"The objective and intended effect is to transform local air quality management so that local authorities focus more on actions to improve air quality and to achieve better public health and environmental outcomes rather than on the monitoring and reporting process"* (Review of Local Air Quality Management (England) - regulatory and guidance changes). This in turn led to revised policy guidance encouraging further involvement of relevant stakeholders particularly those working in public health, to ensure real-world improvement through the regime.

The cost and implications of employing low emission measures within a development should not be onerous, or even negative in the long term. It is much easier and less costly to consider low emission measures (i.e. mitigation) at the forefront of the design process and it may afford long-term financial savings, for instance the inclusion of higher-grade insulation. Other tangible secondary benefits are also clear, such as the potential to market a property with EV charging points. Retrofitting these measures to existing developments, or even into approved schemes, is more difficult. Where worsening air quality can be avoided through improved planning and building design, it should be in everyone's interests. In terms of wider carbon emissions, there is little reason to focus on certain aspects of air pollution without taking advantage of the wider carbon reduction opportunities presented by the planning process (e.g. cycling is preferable to car usage for many reasons, not just the prevention of air pollution).

The National Planning Policy Framework (2024)[1a] encourages this approach, stating (para.199):

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

### 1.4 Regulatory Position of Low Emission Design

The intention of incorporating low emission design is to present a clear set of measures which the developer can incorporate into the scheme at the earliest opportunity and without disproportionate cost or delay.

It is not the intention to impose or enforce certain design criteria on the client or the project team/contractor (unless the AQIA outcomes mandate it). Rather the aim is to highlight certain features which could have a demonstrable benefit in terms of emissions and would be worthwhile considering for inclusion in the design of the scheme. These measures will only be mandatory where defined based upon the significance analysis in the AQIA and in those circumstances that would be clearly stated in Section 3 of this report.

## 1.5 Definitions & Abbreviations

| | |
|---|---|
| **AADT** | Annual Average Daily Trips |
| **AQAL** | Air Quality Assessment Level – Typically the Air Quality Objective, EU Limit/Target, or Environment Agency 'Environmental Assessment Level' |
| **AQAP** | Air Quality Action Plan |
| **AQIA** | Air Quality Impact Assessment |
| **AQMA** | Air Quality Management Area |
| **AQO** | Air Quality Objective |
| **AQS** | Air Quality Strategy |
| **ASR** | Annual Status Report |
| **AURN** | Automatic Urban and Rural Network |
| **BREEAM** | Building Research Establishment Environmental Assessment Method |
| **CEMP** | Construction Environmental Management Plan |
| **$CO_{2e}$** | Carbon Dioxide equivalent – All gaseous emissions are converted to the amount of $CO_2$ needed to create the same effect from other emissions including $NO_x$, methane, $SO_x$ etc. |
| **DEFRA** | Department for Environment, Food & Rural Affairs |
| **EPS** | Environmental Protection Strategies Limited |
| **EPUK** | Environmental Protection UK |
| **EV** | Electric Vehicle |
| **HDV** | Heavy-duty vehicle |
| **IAQM** | Institute of Air Quality Management |
| **kg/CP/yr** | Kilogram per charging point per year |
| **kg/Hse/yr** | Kilogram per household per year |
| **LAQM** | Local Air Quality Management |
| **LDV** | Light-duty vehicle |
| **NGR** | National Grid Reference |
| **$NO_{2/x}$** | Nitrogen Dioxide or Oxides |
| **$PM_{10/2.5}$** | Particulate matter (less than 10 or 2.5 micrometres in diameter) |

## 1.6 Air Quality Objectives/Air Quality Limit Values

At a national level, the UK Government and the devolved administrations (except Northern Ireland) are required under the Environment Act 1995 to produce a national air quality strategy.

The UK Air Quality Strategy (AQS)[1g] was published in July 2007 by the Department for Environment, Food and Rural Affairs (DEFRA). The strategy includes standards, objectives and measures for improving ambient air quality in England, Scotland, Wales and Northern Ireland; including a number of Air Quality Objectives which are detailed within the below table (pollutants not relevant to this assessment have been omitted). These objectives represent either maximum pollutant concentrations which cannot be exceeded, or maximum pollutant concentrations which have a number of permitted exceedances per year. The original target dates for these objectives to be met, and maintained thereafter have all lapsed but these AQO's are still considered relevant (in England) for the most common pollutants. Specific targets for the reduction in $PM_{2.5}$ were introduced in England in 2023 within The Environmental Targets (Fine Particulate Matter) Regulations and The Environmental Improvement Plan. These targets have also been included within the below table:

| Pollutant | Objective | Averaging period (Measured as) |
|---|---|---|
| **$NO_2$** | 40 µg/m$^3$ | Annual mean |
| | 200 µg/m$^3$ | 1-hour mean not to be exceeded more than 18 times a year (DEFRA have advised an indicator for potential exceedances of the hourly mean is an annual mean higher than 60 µg/m$^3$) |
| **$PM_{10}$** | 40 µg/m$^3$ | Annual mean |
| | 50 µg/m$^3$ | 24-hour mean not to be exceeded more than 35 times a year |
| **$PM_{2.5}$** | 20 µg/m$^3$ | Annual mean |
| | 12 µg/m$^3$ | Annual mean interim target to be achieved by end of January 2028 |
| | 10 µg/m$^3$ | Annual mean limit to be achieved by end of December 2040 |

Within the Local Air Quality Management Technical Guidance[1c], updated by DEFRA in 2022, guidance is provided for the scenarios where the AQOs should and should not apply. The example circumstances provided by DEFRA are summarised in the below table.

| Averaging period | Objectives should apply at: | Objectives should not apply at: |
|---|---|---|
| **Annual mean** | - All locations where members of the public might be regularly exposed.<br>- Building façades of residential properties, schools, hospitals, care homes etc. | - Building façades of offices or other places of work where members of the public do not have regular access.<br>- Hotels, unless used as a permanent residence.<br>- Gardens of residential properties.<br>- Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term. |
| **24-hour mean (& 8-hr mean)** | - All locations where the annual mean objective would apply, together with hotels.<br>- Gardens of residential properties | - Kerbside sites (as opposed to locations at the building façade), or any other location where the public exposure is expected to be shorter than the 24-hour mean (or 8-hour relevant mean). |
| **1-hour mean** | - All locations where the annual mean and 24-hour mean objectives apply.<br>- Kerbside sites (for example, pavements of busy shopping streets).<br>- Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more.<br>- Any outdoor locations where members of the public might reasonably expect to spend one hour or longer. | - Kerbside sites where the public would not be expected to have regular access. |
| **15-min mean** | - All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer | |

## 1.7 Significance Definitions

Throughout this report qualitative references are made to the 'significance' of impacts on local air quality brought about through new sources or receptors introduced by the development, these have been defined below. These definitions take into account the impact descriptors in the EPUK & IAQM [2a] guidance, as well as the practical implications as interpreted through EPS' professional judgement. These definitions are not precise and are not intended to be accurately quantifiable at this stage of the assessment process, dispersion modelling may be subsequently used to quantitatively define the impacts within a subsequent Detailed AQIA.

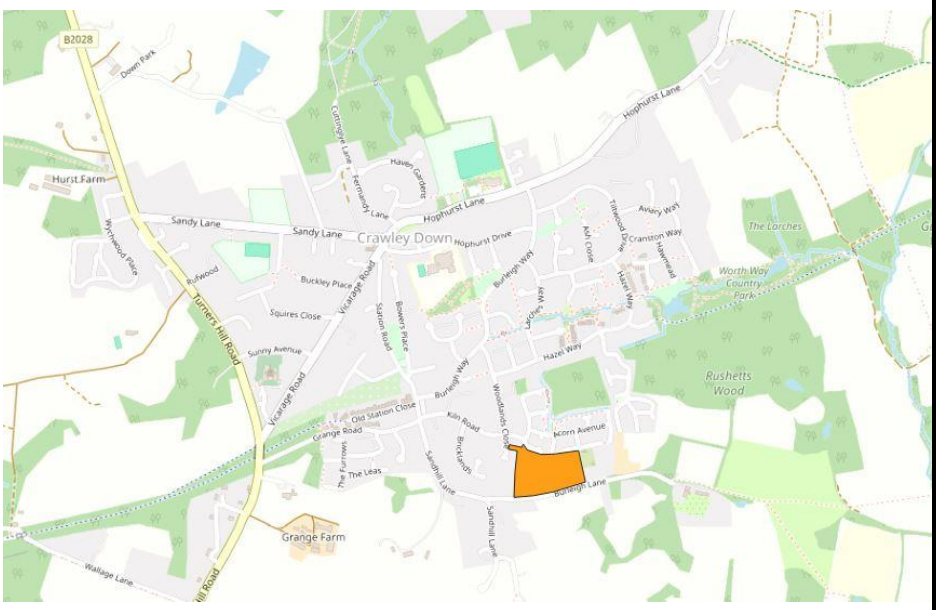
The impact descriptors used in this report by EPS are intended to convey the following definitions:

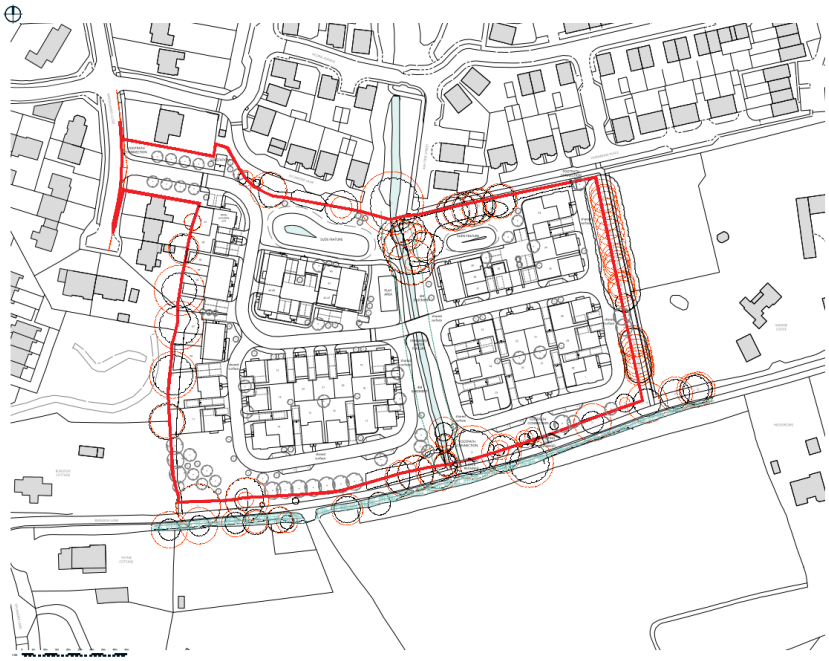
| Impact Descriptor | Definition | Mitigation Requirement |
|---|---|---|
| **BENEFICIAL** | Proposed development may be able to bring about a reduction in emissions compared to existing. | **VOLUNTARY** (FOR GUIDANCE ONLY – NOT MANDATORY) |
| **NEGLIGIBLE** | AQAL clearly not at risk due to sources or receptors introduced by the development. There will be no appreciable impact or any need to model it. | |
| **SLIGHT ADVERSE** | AQAL not at risk due to sources or receptors introduced by the development, although localised decreases in air quality may be noticeable. Modelling to quantify the impact is unlikely to add value. | |
| **MODERATE ADVERSE** | AQAL is unlikely to be at risk due to sources or receptors introduced by the development, although decreases in air quality probably will be noticeable. Modelling (in a Detailed AQIA) may assist in quantifying borderline impacts as well as targeting or refining scope of mitigation. | **NECESSARY** (UNLESS DETAILED AQIA & MODELLING DEMONSTRATES OTHERWISE) |
| **SUBSTANTIAL ADVERSE** | AQAL may be at risk due to sources or receptors introduced by the development, further modelling will be needed to quantify the impact and determine the viability of the scheme, as well as design the necessary mitigation. | **NECESSARY** |

## 1.1 Regulatory Liaison

As recommended in the EPUK guidance, EPS contacted MSDC's Environmental Protection Team regarding this assessment and the approach to managing impacts on air quality. A response was received form Nick Bennett on the 19th March 2025, Senior Environmental Health Officer and is summarised in Section 2.

## 2 SITE SUMMARY

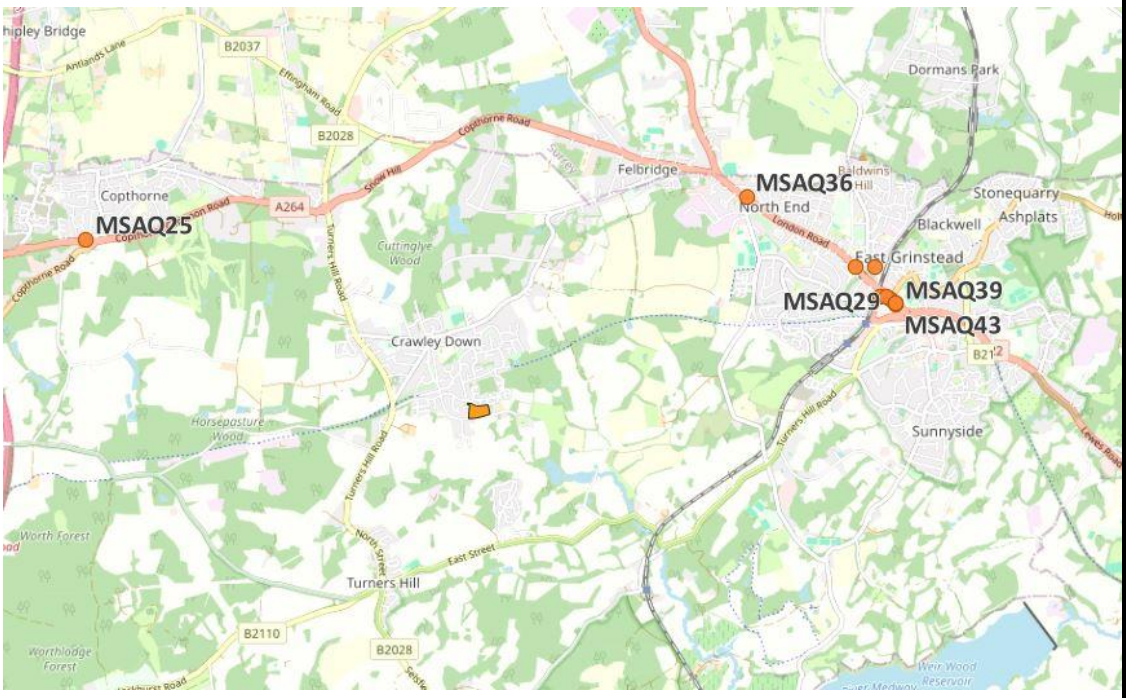
| | |
|---|---|
| **Current Land Use** | The site is located on the southeastern edge of Crawley Down, a village in Mid Sussex located roughly 5km east of Crawley and a similar distance west of East Grinstead. The area covered by the site is c.2.5ha (or 25,000sqm). Currently the site comprises undeveloped grassland with some established trees and vegetation, and some disused agricultural buildings in the centre, which are referred to as 'The Croft' on some maps. Vehicular access is currently gained from Burleigh Land in the south. |
| **Adjacent Land Use** | The site is surrounded by residential dwellings in the north and northwest, with some sporadic larger houses to the south beyond Burleigh Road, surrounded mainly by undeveloped grassland/agricultural fields in the east. London Gatwick airport is located around 7km northwest. |
| **Proposed Land Use** | Current development proposals indicate the construction of 49 residential dwellings with off-street parking, private garden areas, soft landscaping and an access road. Access will be from Woodland Close to the northwest. |
| **Site Location** | National Grid Reference 535292,137355 |
| **Current Layout** |  |

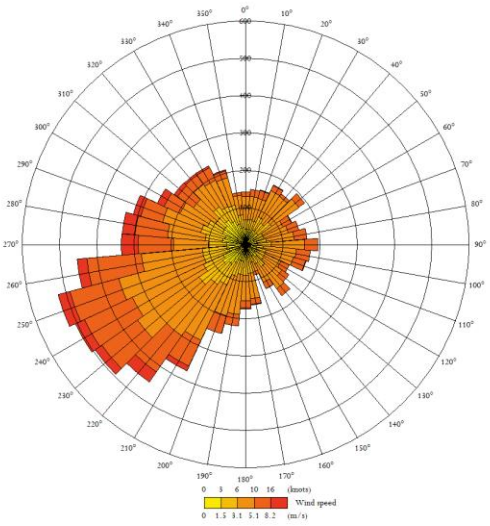
| | |
|---|---|
| **Proposed Layout** (Fluid London: Drg No: FL24-2191-055) |  |

# 3 SIMPLE AIR QUALITY IMPACT ASSESSMENT

The regulatory context and guidance upon which this qualitative AQIA is based is outlined in Appendix A.

## 3.1 Existing & Future Pollutant Sources

| | |
|---|---|
| **Within an Air Quality Management Area, Clean Air Zone or Low Emissions Zone?** | The site is not located within an Air Quality Management Area (AQMA) as declared by Mid Sussex District Council (MSDC). MSDC currently have no active AQMAs in their district, having revoked their designated area at Stonepound Crossroads in Hassocks in December 2024ok (at the southern (opposite) end of the district to the site). The nearest active AQMA is in the Hazelwick area north of Crawley, around 6km west. This AQMA was associated with some busy junctions along the A2011 and M23, caused by road traffic emissions and declared on the basis of recorded levels of nitrogen dioxide (annual mean).<br><br>The site is not located within a Smoke Control Area and there are no Smoke Control Areas in the district. |
| | The below map shows the location of the site along with the local air quality monitoring sites. |
| |  |
| **Regional Air Quality** | Road transport is the dominant source of pollution within Mid Sussex, making up 80% of $NO_2$ roadside concentrations (MSDC, ASR 2024) and therefore reducing road traffic emissions continues to remain the key air quality priority in the district. This will also contribute to reducing $PM_{10}$ and $PM_{2.5}$ concentrations across the district.<br>Following no exceedances of the air quality objectives in 2024, MSDC proceeded, through consultation with DEFRA, to revoke their AQMA in |

<table>
<tr><td></td><td>Hassocks as air quality objectives had been met within the AQMA for five consecutive years. As of March 2025, the AQMA no longer appears on DEFRA's UK Air website.</td></tr>
<tr><td>Historical land use / Emission sources</td><td>There do not appear to be any environmental permits issued for active installations within 500m. The closest permitted installation under 'Part B' Local Authority Pollution Control appears to be a petrol station approximately 3km north on the A264. There does not appear to be any crematoria in the immediate area with the closest located in north of Crawley, approximately 7km northwest. There are no environmental permits for industrial installations issued by the Environment Agency within 500m.<br><br>Historic mapping indicates the site had been primarily utilised as undeveloped agricultural land since earliest mapping in the early 1870s. A brickworks was present in the 1930s, around 150m west, which now appears to have been redeveloped into the 'Bricklands' housing estate. Publicly available aerial imagery (Google Earth™, 2025) indicates the site has not undergone any significant changes or developments in recent years.</td></tr>
<tr><td rowspan="2">Prevailing Wind Direction</td><td>The prevailing wind direction for England is from the south west. The below wind rose presents the records for a weather station at Northolt, generated by CERC's ADMS model. This indicates there was a prevailing south westerly wind direction throughout 2019.</td></tr>
<tr><td>  </td></tr>
<tr><td rowspan="2">Key Future Emission Sources ($NO_x$/PM)</td><td>Construction Phase</td><td>Operational Phase</td></tr>
<tr><td>• Emissions from construction vehicles working on site.<br>• Additional construction traffic on Woodlands Close and Kiln Road delivering materials and removing waste.</td><td>• Diffuse traffic sources from private vehicle usage for residents as well as general operational traffic.<br>• Point sources introduced by new residential boilers, although these may be low $NO_x$.</td></tr>
</table>

**Traffic Assessment / Site Walkover**

At the time of writing EPS understands that a Transport Assessment is currently not available for this development. EPS completed a walkover of the site on the 20th March 2025 and made the following initial observations relating to traffic:

- At the time of visit (10:25am), the key access roads on Woodland Close, Kiln Road and Bramble Lane were all relatively quiet. No cycles or motorbikes were observed in a 10-minute period.
- Only a handful of cars (<6) and very few vans (1) were observed. No lorries/HGVs or buses were observed over this period.
- No bus stops were noted in the immediate vicinity of the site with the closest ~325m northwest on Station Road.
- The neighbouring roads in the residential estate to the north and northwest all appeared to have maintained footpaths and streetlighting.

Site observations are included in the walkover notes in Appendix B.

**Background concentrations**

The following background (i.e. both man-made and natural sources) concentrations of pollutants have been published by DEFRA for 2018. The following data has been collated for NGR 535500, 137500 in 2024.

| Pollutant | Total Background (µg/m³) |
|---|---|
| $NO_x$ | 11.5 |
| $NO_2$ | 8.6 |
| $PM_{2.5}$ | 6.2 |
| $PM_{10}$ | 9.9 |

**Nearby monitoring data (Local Authority)**

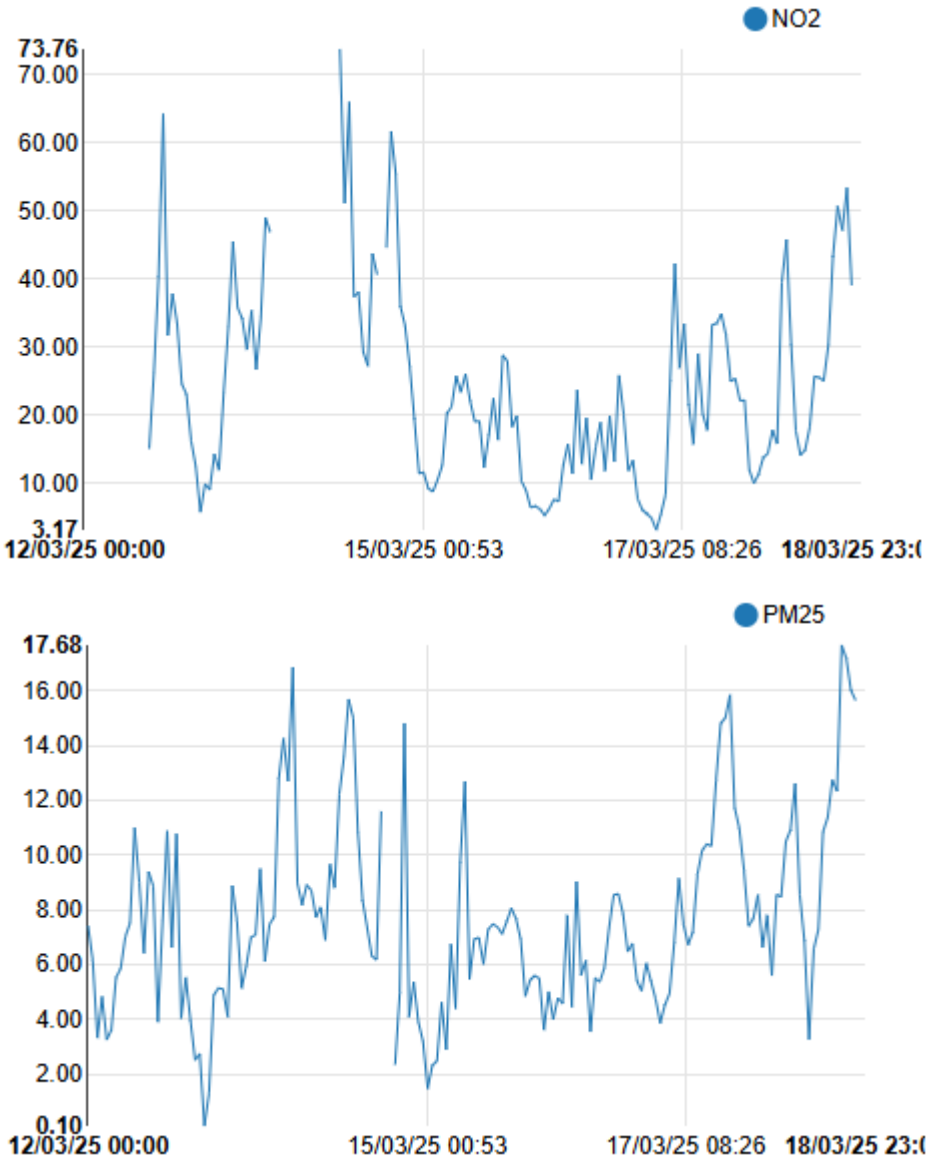
MSDC undertake passive diffusion tube monitoring of $NO_2$ (annual means) at 36 sites in the district, although none are located in Crawley Down. The nearest diffusion tube monitoring locations are within Copthorne to the northwest and East Grinstead to the northeast. The locations of the diffusion tube monitoring sites mainly focus around the town centres of Haywards Heath, Burgess Hill and Hassocks in the south of the district. MSDC also have a continuous monitoring site in East Grinstead, monitoring both $NO_2$ and $PM_{10}$. MSDC undertook continuous monitoring at one location at London Road, East Grinstead.

The nearest monitoring points to the site which are operated by MSDC are as detailed below with their locations included in the above map.

The MSDC monitoring results for 2023 show no monitoring sites exceeded the $NO_2$ annual mean objective of 40µg/m³. The relevant existing monitoring data which was available to EPS, is summarised in the below table.

| Monitoring Station (Local Ref) | Approx distance from proposed site (km) | Monitoring site type | Pollutant Objective | | | |
|---|---|---|---|---|---|---|
| | | | $NO_2$ Annual mean: >40 µg/m³ | | | |
| | | | 2020 | 2021 | 2022 | 2023 |
| Southwick House, London Rd, East Grinstead (MSA Q3) | 3.9 | Kerbside | 12.7 | 14.8 | 14.4 | 12.9 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Bus Stop Lewes Road, East Grinstead (MSAQ5) | 4.3 | Suburban | 20.9 | 22.5 | 20.7 | 17.8 |
| | Erica Way, Copthorne (MSAQ25) | 4.3 | Kerbside | 18.4 | 18.8 | 20.6 | 18.2 |
| | 184 London Rd, East Grinstead (MSAQ29) | 4.2 | Roadside | 32.5 | 33.4 | 31.6 | 29.6 |
| | Lamp post adj to Bridgeway, London Rd, East Grinstead (MSAQ36) | 4.3 | Roadside | 31.6 | 32.7 | 33.5 | 29.8 |
| | Lamp post adj to 10 Station Rd, East Grinstead (MSAQ37) | 4.0 | Roadside | 29.8 | 31.9 | 31.0 | 27.7 |
| | Lamp post adj to 194 London Rd, East Grinstead (MSAQ38) | 4.0 | Roadside | 20.4 | 20.6 | 21.0 | 17.0 |
| | Highway sign adj to 1-45 White Lion Close, East Grinstead (MSAQ39) | 4.2 | Roadside | 23.6 | 25.0 | 25.3 | 21.3 |
| | London Rd, East Grinstead (MSAQ43a,b,c) | 4.0 | Roadside (triplicate) | - | - | 27.4 | 22.5 |
| | London Rd, East Grinstead (MSAQ43) (Automatic ) | 4.0 | Kerbside | - | - | 24.3 | 21.1 |
| | | | | **$PM_{10}$ Annual mean:** >40 µg/m³ | | | |
| | | | | 2020 | 2021 | 2022 | 2023 |
| | London Rd, East Grinstead (MSAQ43) (Automatic ) | 4.0 | Kerbside | - | - | 18.8 | 17.0 |
| | | | | **$PM_{10}$ 24hr mean:** Number of exceedances >50 µg/m³ to not exceed 35 per year | | | |
| | | | | 2020 | 2021 | 2022 | 2023 |
| | London Rd, East Grinstead (MSAQ43) (Automatic ) | 4.0 | Kerbside | - | - | 0 | 1 |
| | Bias adjusted/ratified and annualised figures taken from MSDC 2024 ASR. Unavailable/no data is indicated with a –. | | | | | | |
| | Real-time data was available from Sussex-Air for $NO_2$ and $PM_{2.5}$ from the automatic monitor in East Grinstead. The real time data for the period 12th to the 19th March 2025 has been included below and shows there were eight peaks in the hourly mean for $NO_2$ which exceeded the annual mean air quality objective limit of 40µg/m³ with a maximum concentration of approximately 75µg/m³ during 14th March 2025.<br><br>As stated in the ASR, the Council have derived $PM_{2.5}$ by applying the nationally derived correction factor to their $PM_{10}$ data, the instrument does not directly record $PM_{2.5}$ concentrations. During this period there were no peaks recorded above the annual mean air quality objective limit | | | | | | |

| | |
|---|---|
| | of 20µg/m$^3$ for $PM_{2.5}$, the ASR also states that there were no exceedances of the annual $PM_{2.5}$ objective using this method. |
| |  <br>Source: https://sussex-air.net/ (2025) |
| **Key Sections of Annual Status Report (ASR) and/or Air Quality Action Plan** | MSDC's 2024 ASR is available online, which covers the calendar year of 2023 in terms of data capture. Within the ASR, it highlights a range of actions that have been completed and actions that were to be progressed in 2025 to improve air quality in the district, of which a selection is highlighted below:<br><br>• Improved Cycles Routes<br>• Encourage the use of electric vehicles by providing public charging points<br>• Improved Bus Provision<br>• Optimized traffic lights to real time pollution data |
| **Regulatory Liaison** | As recommended in the EPUK guidance, EPS contacted the Council's Environmental Protection team regarding this assessment and the approach to managing impacts on air quality. EPS received a response |

| | |
|---|---|
| | from Nick Bennett, Senior Environmental Health Officer, who stated as follows: *Thank you for your enquiry. I can confirm acceptance of your proposed approach, but please note that we require application of the Air quality and emissions mitigation guidance for Sussex (2021) and its method of damage costs assessment and mitigation. Please note that our preferred mitigation, where possible, is additional EV charging infrastructure (above and beyond any other requirements for it such as Building Regs or WSCC Parking standards), cycle storage and public transport vouchers, in that order.*<br><br>Within the 2021[3(b)] guidance referred to above, an approach to screening a development to determine whether an Emissions Mitigation Assessment is needed is included. This has been considered in Section 6.1. |
| **Sensitivity of Location** | The information presented above shows the air quality in Crawley Down is good. The site does not lie within or close to an AQMA and there are no automatic or diffusion tube monitoring sites located within the village so it would be fair to assume it is not an area Mid Sussex District Council are particularly concerned with in terms of air quality. Moreover, the closest monitoring sites in Copthorne and East Grinstead indicate both PM and $NO_2$ concentrations well below the national objectives, although the representativeness of the existing diffusion tube locations for this site is limited. The area is close to London Gatwick airport, a major international air terminal although it does not appear to have been identified as an air quality issue for Crawley Down itself.<br><br>The development itself will introduce new sources of pollution which could impact existing and new receptors. This will include private parking and private vehicle usage which will likely peak during 'rush hour' and remain fairly steady throughout the day. There will be more cars accessing the site than its current undeveloped use and a new access point onto existing roads will be created. There is the potential for new point sources from residential boiler systems, although these will likely be low $NO_x$.<br><br>Moreover, the site would also be set within a fairly expansive area with good opportunities for airflow and pollutant dispersion due to the surrounding agricultural/undeveloped fields in the south and east. Online searches of relevant databases indicate there are no significant active environmental permits registered for premises within the immediate vicinity, which would be required to regulate harmful emissions to air. |

# 4 CONSTRUCTION DUST ASSESSMENT

The regulatory context and guidance upon which this dust assessment is based is outlined in Appendix A and Appendix C.

The worst-case scenario impacts from dust caused by earthworks, construction and trackout on sensitive human and ecological receptors have been considered and the significance of any impacts have been analysed following the steps outlined in Appendix C. Dust caused by demolition has not been assessed as no demolition works will need to take place.

A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of the development. Sensitive receptors have been defined for dust and road vehicle emissions in the following tables. For earthworks and construction dust, sensitive receptors were identified in the area up to 250m from the development boundary, while sensitive receptors to potential impacts from trackout dust were identified in an area of up to 50m from the road network within 250m of the site.

**Step 1**

**Earthworks and Construction Dust Sensitive Receptors**

| Distance from Site Boundary | Approximate Number of Human Receptors | Approximate Number of Ecological Receptors |
|---|---|---|
| Up to 20m | 10-100 | 0 |
| Up to 50m | >100 | 0 |
| Up to 100m | >100 | - |
| Up to 250m | >100 | - |

**Trackout Dust Sensitive Receptors**

| Distance from Site Boundary | Approximate Number of Human Receptors | Approximate Number of Ecological Receptors |
|---|---|---|
| Up to 20m | >100 | 0 |
| Up to 50m | >100 | 0 |

A number of sensitive receptors have been identified within 250m, including a number within 20m, of the proposed site so a detailed assessment of potential dust impacts is required.

There are no ecological receptors within 50m of the site boundary or the access route within 500m of the site entrance. As such, ecological impacts have not been assessed further in this report.

<table>
<tr><td rowspan="5">Step 2A</td><td>Activity</td><td colspan="2">Dust Emission Magnitude</td></tr>
<tr><td>Earthworks</td><td colspan="2">Medium</td></tr>
<tr><td>Construction</td><td colspan="2">Medium</td></tr>
<tr><td>Trackout</td><td colspan="2">Medium</td></tr>
<tr><td colspan="3">Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed site is larger than 18,000m$^2$ (at 25,000m$^2$) so in accordance with the IAQM guidance, the magnitude of potential dust emissions from earthworks is therefore deemed medium.<br><br>The proposed development comprises the construction of buildings with a total estimated building volume of between 12,000m$^3$ and 75,000m$^3$ so in accordance with IAQM guidance, the magnitude of potential dust emissions from construction is therefore medium.<br><br>It is anticipated that the unpaved road length will be between 50m and 100m throughout construction so in accordance with IAQM guidance the magnitude of potential dust emissions from trackout is therefore medium.</td></tr>
<tr><td rowspan="5">Step 2B</td><td>Additional factors for consideration when determining area sensitivity</td><td>Comment</td></tr>
<tr><td>History of dust generating activities in the area</td><td>No indication of any dust generating activities in the local area.</td></tr>
<tr><td>Likelihood of concurrent dust generating activity nearby</td><td>A review of the planning portal did not indicate any additional significant development proposals likely to result in concurrent dust generation in the vicinity of the site.</td></tr>
<tr><td>Pre-existing screening between the source and sensitive receptors</td><td>There are plenty of established boundary trees across the site, some of which will be retained post-development. These may provide a barrier between emissions sources and some of the nearby receptors.</td></tr>
<tr><td>Conclusions drawn from analysing representative local meteorological data, and if relevant, the season during which the works will take place</td><td>The predominant wind direction in Crawley Down is from the southwest. As such, receptors to the northeast of the site are most likely to be affected by any dust releases.</td></tr>
<tr><td></td><td>Conclusions drawn from local topography</td><td>There are no significant topographical constraints to dust dispersion.</td></tr>
</table>

| | | |
|---|---|---|
| | Duration of potential impact | It is currently unclear as to the duration of the construction phase, although it is unlikely to extend beyond two years. The sensitivity of nearby receptors is unlikely to change during this period. |
| | Known specific receptor sensitivities which go beyond IAQM guidance classifications | No specific receptor sensitivities identified during the assessment. |

**Step 2B**

| **Potential Impact** | **Sensitivity of the Surrounding Area** | | |
|---|---|---|---|
| | **Earthworks** | **Construction** | **Trackout** |
| **Dust soiling** | High | High | High |
| **Human Health** | Low | Low | Low |

Dust receptors within 250m of the development site include residential dwellings and places of work. These are considered to be of high and medium sensitivity, respectively in accordance with IAQM guidance. The background concentration of $PM_{10}$, as published by DEFRA, for national grid reference 535500,137500 is 9.9µg/$m^3$.

**Step 2C**

| **Potential Impact** | **Risk** | | |
|---|---|---|---|
| | **Earthworks** | **Construction** | **Trackout** |
| **Dust Soiling** | Medium | Medium | Medium |
| **Human Health** | Low | Low | Low |

As indicated in the above table, the potential risk of dust soiling effects is medium for earthworks, construction and trackout. The potential risk of human health impacts is low for earthworks, construction and trackout.

The potential for impacts on human health and dust soiling depends significantly on the distance between the dust generating activity and sensitive receptor location. The above risks have been predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive receptor. Considering this, the actual risks are likely to be lower than those predicted.

<table>
<tr><td rowspan="3">Step 3</td><td colspan="2">The following dust mitigation measures are site-specific and highly recommended, although not compulsory.</td></tr>
<tr><td>Category</td><td>Dust Mitigation Measure</td></tr>
<tr><td>Communications</td><td>• 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<br>• Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time $PM_{10}$ continuous monitoring and/or visual inspections.</td></tr>
<tr><td>Site management</td><td>• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.<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 log book.</td></tr>
</table>

| | | |
|---|---|---|
| | **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 window sills within 100m of site boundary, with cleaning to be provided if necessary.<br>• Carry out regular site inspections to monitor compliance with the DMP, 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.<br>• 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 is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction. |
| | **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 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 active 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 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>• 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. |
| | **Earthworks** | • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.<br>• Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.<br>• Only remove the cover in small areas during work and not all at once. |

| | | |
|---|---|---|
| | **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.<br>• For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. |
| | **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 log book.<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 permit.<br>• Access gates to be located at least 10m from receptors where possible. |

# 5 ASSESSMENT OUTCOMES

## 5.1 Significance Analysis

| **EPS SIGNIFICANCE ANALYSIS**<br>Definitions for significance rankings can be found in Section 1.5. | | BENEFICIAL / NEGLIGIBLE / SLIGHT ADVERSE / MODERATE ADVERSE / SUBSTANTIAL ADVERSE<br>**IMPACT** |
|---|---|---|
| **Receptors** | | The future residents of the development, current and future residents of Woodland Close, Kiln Road and Bramble Lane will be the primary key receptors. |
| **Without Development** | | The air quality in the immediate area is currently good with no AQMAs nearby and the nearest monitoring points are recording an annual mean below the $NO_2$ objective limit of 40µg/m$^3$. |
| **Cumulative Development** | | A review of Mid-Sussex District Council's planning portal has identified that recent proposals in the immediate area have mainly been associated with minor changes to nearby existing residential homes, residential home extensions or changes of use. These developments do not appear to have the potential to add significance to the identified impacts. |
| **With Development** | | |
| **Construction Phase** | **Slight Adverse (Negligible if mitigated)** | During the construction phase, there is the potential for emissions of dust and vehicle fumes to cause annoyance, nuisance and possible health effects to sensitive receptors within close proximity. These impacts will be temporary in nature and can be subject to direct regulation under statutory nuisance provisions if necessary although they should be managed to mitigate potential nuisance. Measures such as a Dust Management Plan (mitigation measures outlined above) coupled with a Construction Environmental Management Plan (CEMP) could be employed to mitigate these impacts.<br><br>The change in traffic quantity and composition along Woodland Close, Kiln Road and Bramble Lane will be noticeable during this phase of the development. The impact is likely to be transient and manageable through good construction practices but likely will be noticeable locally if not well-managed. A 'slight adverse' impact is identified primarily due to the close proximity of residential dwellings. A negligible impact can still be achieved provided the mitigation measures outlined in Section 4 (Step 3) are implemented. |

| | | |
|---|---|---|
| **Operational Phase** | **Slight Adverse** | A 'slight adverse' impact has been assigned during the operational phase as the development itself will introduce new sources of pollution which could impact existing and new receptors, although it almost certainly will not result in failure of Air Quality Objectives. Emissions will primarily be produced by vehicles entering and leaving the residential development which will peak during the morning and evening 'rush hours' and likely remain fairly steady throughout the day. Currently the land is undeveloped, the development is of a reasonable size and a new access point will be created with the village, so a slight adverse impact may be noticeable for residents in that specific area although the development is not envisaged to cause any significant decline in local air quality which would warrant further assessment.<br><br>The development would also not be introducing new receptors to an area with poor air quality, and the rural surroundings to the south and east will promote good air flow and dispersion through the new development. Air quality should not present a barrier to the development.<br><br>Although further assessment or modelling (a Detailed Air Quality Impact Assessment) is not considered necessary, low emission design is still recommended and encouraged. The inclusion of low emission design in this instance is likely to be largely voluntary given the results of this assessment, although there will be a mandatory element based on Sussex' Mitigation Assessment which can be calculated in due course when further detailed designs become available (see Section 6.1). Achieving the EPS' voluntary point's designation for 'slight adverse' outlined in Section 6 would be recommended to demonstrate a decent standard of low emission design. To aid the process of low emission design, details on what measures could be employed are included in the following section. |

# 6 MITIGATION & LOW EMISSION DESIGN

## 6.1 Sussex Air Quality & Emissions Mitigation Guidance

As Stated in Section 3, the Council highlighted the *Sussex Air Quality Partnership's Air Quality & Emissions Mitigation Guidance for Sussex,* 2021.

Under this guidance, the site will meet the definition of a 'major development' as it is in excess of 10 dwellinghouses. So despite not being in a sensitive area for air quality, an Emissions Mitigation Assessment will be required in due course.

At this early stage of the development it will not be possible to undertake the assessment accurately as there are no details available around provision of EV charging infrastructure, cycle storage or public transport vouchers as is the Council's preference. But this type of assessment will align well with EPS' standard Low Emission Design approach outlined below, and these measures should be considered for employment into the scheme now. A selection of measures from the inventory in Appendix E (with particular focus on EV charging infrastructure, cycle storage and public transport vouchers) achieving EPS suggested 'point provision' (see below) is also likely to achieve the Council's requirements. EPS can formalise the emissions mitigation measures intended for employment in this scheme when the relevant designs/planning permissions are progressed

## 6.2 EPS' Low Emission Design

To ensure an effective low emission approach is adopted, and the right aspects prioritised if the client wishes to employ them at the earliest stage of the design, EPS have prepared an inventory of low emissions measures and cited publicly available references in order to generate approximate emission savings of both nitrogen oxides and carbon. These are not exact predictions, or site-specific but they may be useful in determining the relative benefit of each measure.

There is a wide range of variables and uncertainty which restricts the accuracy of determining these emission benefits to a high level of accuracy so they should not be viewed in that context, but the inventory does show clear quantifiable relative benefits for each measure to highlight where it's worth focussing resources. The Low Emissions Inventory is included in Appendix E and includes the relevant references for the sources of information used. EPS' workings for the inventory are included in Appendix F.

It is important to note that the inventory is largely based on generic household emissions generated by a typical residential development. It does not account for site-specific factors and there will be differences when applied to a school or place of work. If needed, at a later stage further site-specific assessment could be applied using EPUK & IAQM's approach to 'Offsetting Emissions' in their 2017 guidance[2a], for $NO_x$ and $PM_{10}$.

The Low Emission Design is split into the following four areas covered by the inventory:

1. Low Emission Private Transport & Travel Planning
2. Energy Efficiency of the Built Environment
3. Optimised Development
4. Construction Phase

The specific measures for each category, with comments and an approximate emission benefit specific to this site are included in the following tables. Each Low Emission Measure has been given a 'Low Emission point' which is scored out of three. This is based on the measure's qualitative benefit to the proposed scheme and local air quality, based on EPS' judgement and reference calculations, with three being the highest benefit and one being the lowest benefit.

A more detailed analysis of different aspects within each Low Emissions Measure can be found in Appendix E, EPS would recommend Appendix E is used when deciding which Low Emission Measures will benefit your project.

For example, if the significance analysis identifies a 'Beneficial' or 'Negligible' impact on local air quality, EPS recommend you achieve 5 Low Emission Points. For 'Slight Adverse' impact, EPS recommends 10 points are achieved and so forth as shown in the table below. These recommendations will be voluntary unless the AQALs are at risk:

| Impact Significance | EPS Low Emission Points Recommendation* | Mitigation Requirement |
|---|---|---|
| BENEFICIAL | 5 | VOLUNTARY (FOR GUIDANCE ONLY – NOT MANDATORY) |
| NEGLIGIBLE | 5 | |
| SLIGHT ADVERSE | 10 | |
| MODERATE ADVERSE | 12 | NECESSARY (UNLESS DETAILED AQIA DEMONSTRATES OTHERWISE) |
| SUBSTANTIAL ADVERSE | 15+ | NECESSARY |

*In Sussex, this allowance will need to take account of the document: *Sussex Air Quality Partnership - Air Quality and Emissions Guidance for Sussex* (v1.1, 2021)

| 1. LOW EMISSION PRIVATE TRANSPORT & TRAVEL PLANNING | | EMISSIONS BENEFIT |
|---|---|---|
| Low Emission Vehicle Support | Cabling and wiring/consumer unit infrastructure could be installed to facilitate at least Rapid (43/50KW) charging points. Ideally at least 10% of parking spaces should have a dedicated Electric Vehicle (EV) charging point which the Council will likely require. It is important to install cabling/capacity for future-proofing wider scale EV charging, if possible. | **High** |
| Travel Plans & Car Share Schemes | Benefits to be had particularly with parents taking their children to the local schools, such as car sharing or walk to school initiatives. Direct emissions benefits are small, but these are low-cost and have long-term wider health benefits and reduced traffic congestion while achieving increased air quality awareness. | **Low** |
| Infrastructure to support public transport uptake | Any public transport enhancements to be encouraged such as increased pedestrian/cycling infrastructure. | **Low** |

| 2. ENERGY EFFICIENCY OF THE BUILT ENVIRONMENT | | EMISSIONS BENEFIT |
|---|---|---|
| Building Sustainability | Achieving standards such as a BREEAM Outstanding rating or equivalent accredited schemes do provide significant emission benefits but do carry an increased cost. Enhanced insulation and energy efficiency should be pursued where possible, regardless of whether a recognised standard is being pursued. An Indoor Air Quality Plan can inform effects on indoor air. | **High** |
| Renewables | Typically, at least 10% of the buildings total predicted energy requirement should be from on-site renewable energy sources, a local planning requirement may stipulate a higher proportion. This could be achieved through solar panels and/or small wind turbines. | **High** |
| Biomass Boilers | This form of heating can be beneficial in terms of carbon emissions but carries a $NO_x$/PM burden and Local Planning Authorities may have local design requirements which need to be adhered to. Biomass boilers can have the highest energy output among any boilers (circa 92%). | **Moderate** |
| Air source/Ground source heat pumps | This form of heating is beneficial in terms of $NO_x$ and carbon emissions along with using very little electricity to operate. Heat pumps have an energy output of up to 300% and homeowners are able to earn money back under the Renewable Heat Incentive Scheme. | **Moderate** |
| Combined Heat & Power (CHP) / Boiler Efficiency | Developments should utilise low $NO_x$ boilers to minimise emissions. Typically, a low $NO_x$ boiler would meet a dry $NO_x$ emission rating of 40mg/kWh. There may also be a planning requirement for achieving this. | **Moderate** |

| 3. OPTIMISED DEVELOPMENT | | EMISSIONS BENEFIT |
|---|---|---|
| Site layouts & proximity of housing to roads | There are negligible reductions in emissions, but design layouts which reduce exposure of receptors to pollutants are preferable, particularly in terms of proximity to busy roads and introducing any 'canyon' effect. | **Low** |
| Sealed fascias/active (artificial) ventilation or active air filtration ($NO_x$ filters etc.) | Sealed fascias or mechanical ventilation would not be needed in this location (on air quality grounds). It is always a 'last resort' to use physical infrastructure to manage risks from air quality as it will require oversight, enforcement and maintenance throughout its operational lifespan. | **Low** |
| Building Design | Favourable design measures include the avoidance of tight/tall streets (canyons) and increasing sustainable/well-insulated building design. | **High** |

| 4. CONSTRUCTION PHASE | | EMISSIONS BENEFIT |
|---|---|---|
| Construction Vehicles | All commercial road vehicles used in the construction should meet the European Emission Standards (commonly known as Euro standards) of Euro 5 during any works that take place wherever possible. | **Low** |
| Construction Road Layout | Favourable design measure including speed restrictions & traffic management. | **Low** |
| Construction Environmental Management Plan (CEMP) | If a CEMP is produced it should cover site activities such as plant emissions, switch-off policy and plant maintenance. Dust management will also be a key, a Dust Management Plan can be used to supplement CEMP with measures included in this report. | **Moderate** |

**END**

# APPENDICES

# APPENDIX A

# Regulatory Context

**REGULATORY CONTEXT OF AIR QUALITY IMPACT ASSESSMENT – LAND AT BURLEIGH LANE, CRAWLEY DOWN**

The following sources of information have formed the basis for the AQIA:

## 1. NATIONAL POLICY & TECHNICAL GUIDANCE

(a) NPPF – National Planning Policy Framework (December 2024), specifically para. 199
(b) DEFRA – Planning Practice Guidance: Air Quality (2019)
(c) DEFRA – Local Air Quality Management: Technical Guidance TG22 (2022)
(d) DEFRA – Local Air Quality Management: Policy Guidance PG22 (2022)
(e) DEFRA – Clean Air Strategy 2019
(f) DEFRA – UK Air Information Resource (2020)
(g) DEFRA, Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland – The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (July 2007)

## 2. INDUSTRY GUIDANCE & BEST PRACTICE

(a) EPUK & IAQM - Land-Use Planning & Development Control: Planning for Air Quality (2017)
(b) IAQM – Guidance on the assessment of dust from demolition and construction – Version 2.2 (2024)

## 3. LOCAL POLICY/STATUTORY REPORTING

(a) Mid Sussex District Council – 2024 Air Quality Annual Status Report
(b) Sussex Air Quality Partnership - Air Quality and Emissions Guidance for Sussex (v1.1, 2021)

# APPENDIX B

# Selected Site Photographs and Walkover Notes

| | |
|---|---|
| Photo 1: View across the site. | Photo 2: View across the site. |
|  |  |
| Photo 3: Photograph of dilapidated buildings in central area. | Photo 4: Photograph of dilapidated buildings in central area. |
|  |  |
| Photo 5: View across the site. | Photo 6: View across the site. |
|  |  |

| | |
|---|---|
| **Job No.** | UK25.7341 |
| **Date** | 20/3/25 |
| **Who?** | OC |

To be completed by consultant for all AQIAs and form must be scanned/photographed and saved in job folder under 'Scanned Site Notes'.

## Air Quality Walkover Checklist V1.1

| | |
|---|---|
| **What is the land currently used for?** | Undeveloped fields and disused buildings |
| **What are the obvious sources of emissions on site? (i.e. traffic, idling cars, boilers, industrial)**. Include details about boiler emissions rating or stack height, if known. | None |
| **Are the source areas close to sensitive areas such as playgrounds?** | NA |
| **How many parking spaces currently onsite?** | None - small area of hard standing could fit 2 cars |
| **What is the adjacent land currently used for?** | Housing and arable land |
| **How many parking spaces on adjacent land?** | Unknown, only driveways on houses |

**How busy are the nearby roads?**
Observe for 10 mins and record start/finish time and traffic volume and type

| | Road 1 | | Road 2 | | Road 3 | | Road 4 | |
|---|---|---|---|---|---|---|---|---|
| **Road name** | **Woodland close** | | **Kiln road** | | **Bramble lane** | | | |
| **Start time** | **10:25** | | **10:25** | | **10:25** | | | |
| **Finish time** | **10:35** | | **10:35** | | **10:35** | | | |
| **Road direction (facing N/S/E/W)** | **N** | **S** | **W** | **E** | **W** | **E** | ⇦ | ⇨ |
| **Pedal cycles** | | | | | | | | |
| **Motorcycles and scooters** | | | | | | | | |
| **Cars and taxis** | | **4** | **5** | **1** | | **1** | | |
| **Vans and LCVs** | **1** | | **1** | **1** | **1** | | | |
| **Buses and coaches** | | | | | | | | |

| | |
|---|---|
| **Job No.** | UK25.7341 |
| **Date** | 20/3/25 |
| **Who?** | OC |

To be completed by consultant for all AQIAs and form must be scanned/photographed and saved in job folder under 'Scanned Site Notes'.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Lorries and HGVs** | | | | | | | | |
| **Any congestion or traffic calming/lights on nearby roads?** | No | | | | | | | | |
| **Any street canyons or dense buildings on site or in the surrounding area?** If so, estimate width of road and distance between buildings | No | | | | | | | | |
| **Any stacks or evidence of industrial emissions in surrounding area?** | No | | | | | | | | |
| **Any obvious monitoring stations in the vicinity?** (i.e. diffusion tubes, continuous stations). | No | | | | | | | | |
| **Are there any pedestrian crossings near the site?** | No | | | | | | | | |
| **Any existing low emission measures? EV charging points, cycling infrastructure?** | No | | | | | | | | |
| **Is there any existing public transport provision for the new development?** Nearby bus stops, cycle lanes, paths etc.? | Pavements | | | | | | | | |
| **Anecdotal information on air quality/traffic from local residents/caretakers etc.?** | NA | | | | | | | | |
| **Any other comments?** | No | | | | | | | | |

# APPENDIX C

# Dust Assessment Methodology

## CONSTRUCTION PHASE ASSESSMENT METHOLOGY

Fugitive dust emissions can potentially occur during construction phase activities. The effects associated with the demolition/site preparation, earthworks and construction phase have been qualitatively assessed in accordance with the methodology outlined within the IAQM's 2024 '*Guidance on the Assessment of Dust from Demolition and Construction*' [2b] and professional judgement.

The significance of effects associated with the construction phase have been determined using the following tasks and methodology.

- Evaluation of the proposed site layout, to determine the size of the site and possible construction activities that could generate dust and $PM_{10}$, their likely location and duration.
- Identification of any natural shelters, such as trees, likely to reduce the risk of wind-blown dust.
- Assessing the potential distance which the construction traffic will travel across unpaved roads on the construction site, prior to accessing the local road network (referred to as 'trackout').
- Identification of the location and type of sensitive receptors within 250m of the boundary of the site and/or within 50m of the routes used by construction vehicles on public highways, up to 250m from the site entrance.
- Indication of the number of receptors and sensitivity types of nearby sensitive receptors at different distances from the site boundary (or dust generating activities).

Activities during the construction phase have been divided into four types to reflect their different potential impacts. These are:

- Demolition
- Earthworks
- Construction
- Trackout

The potential dust emissions from these activities have been assessed and considered against the following dust impacts:

- Nuisance due to dust soiling
- Risk to health from increase in exposure to $PM_{10}$
- Harm to ecological receptors

The dust assessment steps as detailed within the IAQM guidance are discussed below:

**Step 1:**

Step 1 of the dust assessment screens the requirement for a more detailed assessment. An assessment will usually be required if there are human receptors present within 250m of the site boundary, or human receptors within 50m of the routes expected to be used by the construction vehicles within a 250m boundary of the site entrance.

An assessment is also required if there is an ecological receptor within 50m of the site boundary or within 50m of the routes expected to be used by the construction vehicles within a 250m boundary of the site entrance.

Further assessment of dust emissions is not required if there are no sensitive receptors present within the abovementioned distances.

**Step 2:**

Step 2 assesses the risk of dust impacts. This step is split into three additional steps which are detailed below.

**Step 2A** defines the potential dust emission magnitude for each activity using the below criteria:

| Activity | Magnitude | | |
|---|---|---|---|
| | **Small** | **Medium** | **Large** |
| **Demolition** | • Total building volume <12,000m$^3$<br>• Construction material with low potential for dust release (e.g. metal cladding or timber)<br>• Demolition activities <6m above ground<br>• Demolition during wetter months | • Total building volume 12,000m$^3$ – 75,000m$^3$<br>• Potentially dusty construction material<br>• Demolition activities 6-12m above ground level | • Total building volume >75,000m$^3$<br>• Potentially dusty construction material (e.g. concrete)<br>• On-site crushing and screening<br>• Demolition activities >12m above ground level |
| **Earthworks** | • 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 site area 18,000m$^2$ – 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 3m - 6m in height | • Total site area >110,000m$^2$<br>• Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size)<br>• >10 heavy earth moving vehicles active at any one time<br>• Formation of bunds >6m in height |
| **Construction** | • Total building volume <12,000m$^3$<br>• Construction material with low potential for dust release (e.g. | • Total building volume 12,000m$^3$ – 75,000m$^3$<br>• Potentially dusty construction | • Total building volume >75, 000m$^3$<br>• On-site concrete batching<br>• Sandblasting |

| | | | |
|---|---|---|---|
| | metal cladding or timber) | material (e.g. concrete)<br>• On-site concrete batching | |
| **Trackout** | • <20 Heavy-duty vehicle (HDV) (>3.5t) outward movements in any one day<br>• Surface material with low potential for dust release<br>• Unpaved road length <50m | • 20-50 HDV (>3.5t) outward movements in any one day<br>• Moderately dusty surface material (e.g. high clay content)<br>• Unpaved road length 50m – 100m | • >50 HDV (>3.5t) outward movements in any one day<br>• Potentially dusty surface material (e.g. high clay content)<br>• Unpaved road length >100m |

**Step 2B** defines the sensitivity of the area by considering the specific sensitivities of receptors in the area, the proximity and number of those receptors, the background concentration and site-specific factors including 'natural shelters' such as trees which could reduce the risk of wind-blown dust. The general principles for assessing this are detailed in the below table:

| **Receptor** | **Receptor Sensitivity** | | |
|---|---|---|---|
| | **Low** | **Medium** | **High** |
| **Sensitivities of people and property to dust soiling effects** | • The enjoyment of amenity would not reasonably be expected<br>• Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or<br>• There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.<br>• Examples include playing fields, farmland (unless commercially- | • Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home<br>• The appearance, aesthetics or value of their property could be diminished by soiling<br>• The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land | • Users can reasonably expect enjoyment of a high level of amenity<br>• The appearance, aesthetics or value of their property would be diminished by soiling<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>• Examples include: dwellings, museums, medium and long-term car parks and car showrooms |

| Receptor | Receptor Sensitivity | | |
|---|---|---|---|
| | **Low** | **Medium** | **High** |
| | sensitive horticultural), footpaths, short term car parks and roads | • Examples include parks and places of work | |
| **Sensitivities of people to the health effects of $PM_{10}$** | • Locations where human exposure is transient<br>• Examples include public footpaths, playing fields, parks and shopping streets | • Locations where the people exposed are workers, 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>• Examples include office and shop workers, but will generally not include workers occupationally exposed to $PM_{10}$, as protection is covered | • 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)<br>• Examples include residential properties, hospitals, schools and residential care homes |

| Receptor | Receptor Sensitivity | | |
|---|---|---|---|
| | **Low** | **Medium** | **High** |
| | | by Health and Safety at Work legislation | |
| **Sensitivities of receptors to ecological effects** | • Locations with a local designation where the features may be affected by dust deposition<br>• Example is a local Nature Reserve with dust sensitive features. | • 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>• Example is a Site of Special Scientific Interest (SSSI) with dust sensitive features | • 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.<br>• 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. |

The criteria for assessing the sensitivity of the area to dust soiling effects is summarised in the below table.

| Receptor sensitivity | Number of receptors | Distance from the source | | | |
|---|---|---|---|---|---|
| | | <20m | <50m | <100m | <250m |
| 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 |

The criteria for assessing the sensitivity of the area to human health impacts is summarised in the below table.

| Receptor Sensitivity | Annual mean $PM_{10}$ concentration | Number of Receptors | Distance from the source | | | |
|---|---|---|---|---|---|---|
| | | | <20m | <50m | <100m | <250m |
| High | >32 µg/m$^3$ | >100 | High | High | High | Medium |
| | | 10-100 | High | High | Medium | Low |
| | | 1-10 | High | Medium | Low | Low |
| | 28-32 µg/m$^3$ | >100 | High | High | Medium | Low |
| | | 10-100 | High | Medium | Low | Low |
| | | 1-10 | High | Medium | Low | Low |
| | 24-28 µg/m$^3$ | >100 | High | Medium | Low | Low |
| | | 10-100 | High | Medium | Low | Low |
| | | 1-10 | Medium | Low | Low | Low |
| | <24 µg/m$^3$ | >100 | Medium | Low | Low | Low |
| | | 10-100 | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low |
| Medium | >32 µg/m$^3$ | >10 | High | Medium | Low | Low |
| | | 1-10 | Medium | Low | Low | Low |
| | 28-32 µg/m$^3$ | >10 | Medium | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low |
| | 24-28 µg/m$^3$ | >10 | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low |
| | <24 µg/m$^3$ | >10 | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low |
| Low | - | ≥1 | Low | Low | Low | Low |

The criteria for assessing the sensitivity of the area to ecological impacts is summarised in the below table.

| Receptor sensitivity | Distance from the source | |
|---|---|---|
| | <20m | <50m |
| **High** | High | Medium |
| **Medium** | Medium | Low |
| **Low** | Low | Low |

A number of additional factors should be considered when determining the sensitivity of an area, these are listed below:

- Any history of dust generating activities in the area
- Likelihood of concurrent dust generating activity on nearby sites
- Any pre-existing screening between the source and the receptors
- Any conclusions drawn from analysing local meteorological data which accurately represent the area and if relevant the season during which the works will take place
- Any conclusions drawn from local topography
- Duration of the potential impact, as a receptor may become more sensitive over time
- Any known specific receptor sensitivities which go beyond the classifications given in this document

**Step 2C** involves defining the risk of impacts by combining the sensitivity of the area determined in Step 2B with the dust emission magnitude which was determined in Step 2A.

| **Demolition** | | | |
|---|---|---|---|
| **Sensitivity of area** | **Dust Emission Magnitude** | | |
| | **Large** | **Medium** | **Small** |
| **High** | High Risk | Medium Risk | Medium Risk |
| **Medium** | High Risk | Medium Risk | Low Risk |
| **Low** | Medium Risk | Low Risk | Negligible |
| **Earthworks** | | | |
| **Sensitivity of area** | **Dust Emission Magnitude** | | |
| | **Large** | **Medium** | **Small** |
| **High** | High Risk | Medium Risk | Low Risk |
| **Medium** | Medium Risk | Medium Risk | Low Risk |
| **Low** | Low Risk | Low Risk | Negligible |

| Construction | | | |
|---|---|---|---|
| **Sensitivity of area** | **Dust Emission Magnitude** | | |
| | **Large** | **Medium** | **Small** |
| **High** | High Risk | Medium Risk | Low Risk |
| **Medium** | Medium Risk | Medium Risk | Low Risk |
| **Low** | Low Risk | Low Risk | Negligible |
| **Trackout** | | | |
| **Sensitivity of area** | **Dust Emission Magnitude** | | |
| | **Large** | **Medium** | **Small** |
| **High** | High Risk | Medium Risk | Low Risk |
| **Medium** | Medium Risk | Low Risk | Negligible |
| **Low** | Low Risk | Low Risk | Negligible |

**Step 3:**

Step 3 involves identifying the appropriate site-specific mitigation measures. These measures are detailed within the IAQM guidance and are utilised to reduce potential dust emissions during demolition, earthworks, construction, and trackout along with additional measures for good dust management.

For proposed sites which result in a 'negligible' risk, no mitigation measures beyond those required by legislation are required. Through good construction practises though, mitigation measures may be still be applied.

All dust mitigation measures suitable for this site's level of risk can be found in Appendix D.

**Step 4:**

When the risk of dust impacts has been identified following Step 2C, and the appropriate mitigation measures have been determined in Step 3, the final step in the dust assessment is to determine the significance of the remaining effects from the Construction Phase of the project. The aim should be to prevent significant effects on receptors through adoption of mitigation measures, so in the majority of cases, the residual effect will be 'not significant'.

# APPENDIX D

# General Dust Mitigation Measures (Medium Risk)

## MEDIUM RISK DUST MITIGATION METHODS

The following highly recommended and desirable best practice mitigation measures have been taken from the IAQM (2024) Guidance on the Assessment of Dust from Demolition and Construction document. Developers should implement the appropriate dust and pollution control measures set out below to ensure the air quality impacts of construction and demolition are minimised and any mitigation measures employed are effective.

These will need to be written into a dust management plan (DMP), which should be approved by the local planning authority prior to commencement of work on site. For major sites, the DMP may be integrated into the Construction Environmental Management Plan, and compliance monitoring may be required.

The following measures are based on '**Medium Risk**' sites, which has been determined in the Dust Risk Assessment section. The following dust mitigation measures are site-specific and highly recommended, although not compulsory.

| Category | Dust Mitigation Measure |
|---|---|
| **Communications** | • 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<br>• Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time $PM_{10}$ continuous monitoring and/or visual inspections. |
| **Site management** | • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.<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 log book. |
| **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 window sills within 100m of site boundary, with cleaning to be provided if necessary. |

| | |
|---|---|
| **Monitoring Cont.** | • Carry out regular site inspections to monitor compliance with the DMP, 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.<br>• Agree dust deposition, dust flux, or real-time PM10 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. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction. |
| **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 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 active 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 on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.<br>• 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>• 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. |
| **Demolition** | • Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).<br>• Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.<br>• Avoid explosive blasting, using appropriate manual or mechanical alternatives.<br>• Bag and remove any biological debris or damp down such material before demolition. |
| **Earthworks** | • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.<br>• Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.<br>• Only remove the cover in small areas during work and not all at once. |
| **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.<br>• For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. |

| | |
|---|---|
| **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 log book.<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 permit.<br>• Access gates to be located at least 10 m from receptors where possible. |

# APPENDIX E

# Low Emission Design – Inventory

# Low Emission Design – Inventory

The Low Emissions Inventory is split into the following categories:

1) Low Emission Private Transport & Travel Planning
2) Energy Efficiency of Built Environment
3) Optimised Development
4) Construction Phase

Categories 1-3 relate to the operational phase of the development. Category 4 relates to the construction phase.

For each measure, EPS have utilised publicly available reference documents to generate a quantitative benefit in terms of emissions coupled with a range of assumptions. To accurately determine the cost for each of these measures for a specific development would contain too many variables, so a qualitative description will be added where relevant. The basis for these calculations and assumptions is included at the end of this Appendix. If any third party or Environmental Health team have comments to make which could add value to this process, such as where better reference materials could be utilised, EPS would welcome that input and should be contacted on 01954 710666 / info@epstrategies.co.uk and ask to speak to a member of the Air Quality Team.

Other measures may have minimal direct impact on emissions, but do have associated public health effects such as encouraging walking or cycling instead of private car usage. There is an intrinsic but intangible link between local air quality management and public health, and it may be any area to further quantify in future although currently EPS have added a qualitative comment where relevant.

Certain measures, such as public transport infrastructure will invariably have emissions benefits which may often be significant, but a generic quantitative emission saving is not possible to determine so they are denoted as 'NA'.

Wherever possible, EPS have utilised reference documents which apply ideally to England and Wales if not the whole UK. However, it certain instances publicly available data from South Cambridgeshire has been incorporated as the process was borne out of collaborative working between EPS and the Council. All references are included on the figures at the end of this Appendix.

**Units**

Kg/CP/YR - kilograms per charging point per year
Kg/Hse/YR - kg per household/year
mg/kWh – Milligram per Kilowatt Hour

### 1) Low Emission Private Transport & Travel Planning

| Low Emission Measure | Comment | Detail | | Approx. Emissions Saved | | Low Emission point Based on EPS' Recommendation |
|---|---|---|---|---|---|---|
| | | | | $NO_x$ | $CO_2e$ | |
| Low Emission Vehicle Support | To encourage the adoption of low emission forms of transport, including private vehicles such as hybrid, electric (EV) and hydrogen powered cars.<br><br>Charging points or at a minimum the installation of electrical infrastructure to facilitate the future installation of charging points to assist in uptake. | Dedicated Charging Point(s) | Superfast (120KW+) | 260 kg/CP/yr | 1550 kg/CP/yr | 3 |
| | | | Rapid (43/50KW) | 125 kg/CP/yr | 745 kg/CP/yr | 3 |
| | | | Fast (7-22KW) | 20 kg/CP/yr | 125 kg/CP/yr | 2 |
| | | | Slow (3KW) | 5 kg/CP/yr | 30 kg/CP/yr | 1 |
| | | | Hydrogen | 0.1 kg/Hse/yr | 0.8 kg/Hse/yr | 1 |
| | | Wiring/consumer unit infrastructure for future upgrade in all properties with parking provision. | | 3 kg/Hse/yr | 20 kg/Hse/yr | 1 |
| Travel Plans & Car Share Schemes | To encourage modal shift and behavioural trends away from private individual transport. Range of measures typically to include:<br><br>- Car clubs, share schemes and any associated infrastructure.<br>- Proposals to prioritise EV parking and encouragement of casual cycling, including electric cycles (EC) | Secure cycle racks / with power for EV charging | | <0.001* kg/Hse/yr | <0.001* kg/Hse/yr | 2 |
| | | Dedicated cycle ways/walkways on site, connecting to existing infrastructure where possible | | | | |
| | | Travel planning aids/ relevant way finding signage | | | | |
| | | Minimal car parking provision where appropriate (i.e. lower emission travel available) | | | | |
| | | Measures to discourage car usage, such as preferable walkways, cycle routes or separate parking lots. Parking enforcement for non-allocated spaces. | | | | |
| | | Provision of low emission pool car/Zip Car etc. | | | | |
| | | Measures to encourage casual cyclists, such as arranged discounts in local shops, servicing arrangements or repairs. | | | | |
| Infrastructure to support public transport uptake | Measures ranging from minor infrastructure such as bus stops to substantial civil infrastructure enhancement, such as new guided busways, train stations, long-term funded shuttles to public transport hubs. | | | N/A | N/A | 3 |

*Although these measures seem to have small emission savings, their savings in a large project can be significant and their costs are typically far lower than other measures listed.

## 2) Energy Efficiency of Built Environment

| Low Emission Measure | Comment | Detail | | Approx. Emissions Saved | | Low Emission Points |
|---|---|---|---|---|---|---|
| | | | | $NO_x$ (mg/kWh) | $CO_2$ (Kg/Hse/YR) | Based on EPS' Recommendation |
| Building Sustainability | Aim to maximise the sustainability of the built environment to achieve mutually beneficial air quality objectives. Utilising the BREEAM rating for the Code for a Sustainable Built Environment or BRE's Home Quality Mark is one approach, others may be suggested. | BREEAM Rating | Outstanding | 110 | 2850 | 3 |
| | | | Excellent | 80 | 1825 | 2 |
| | | | Pass/Very Good | 50 | 775 | 1 |
| | | Home Quality Mark | | 125 | 5200 | 3 |
| | | Other demonstrable energy efficiency measures such as insulation, cavity wall insulation, double-glazing, high-energy performance certification etc. | | 30 | 1025 | 2 |
| Renewables | At least 10% of the buildings' total predicted energy requirement will be from on-site renewable energy sources. | | | 150 | Up to 5200 | 3 |
| Biomass Boilers | A local requirement or checklist may be applicable from Local Environmental Health Dept. | | | -100** | 2400 | 2 |
| Air-source/ Ground-source Heat Pumps | No emission saving information currently available. | | | N/A | N/A | 2 |
| Combined Heat & Power (CHP) / Boiler Efficiency | Developments should utilise low NOx boilers/CHP to minimise emissions from the development that may impact on air quality.<br><br>Typically, a low NOx boiler would meet a dry NOx emission rating of 40mg/kWh. | Boiler Efficiency Achieved | | 110 | 2600 | 3 |
| | Any gas-fired CHP shall meet an emissions standard of:<br><br>- Spark ignition engine: less than 150mgNOx/$Nm^3$<br>- Compression ignition engine: less than 400 mgNOx/$Nm^3$<br>- Gas turbine: less than 50mgNOx/$Nm^3$<br><br>CHP's best application is in facilities with high electric load such as hospitals, schools, industrial facilities and hotels. | CHP Efficiency Achieved | | -950 | 1550 | 2 |

**$NO_x$ emissions for Biomass Boilers is a negative value as such boilers emit more nitrogen oxides and particulates than a traditional gas-fired boiler.

### 3) Optimised Development

| Low Emission Measure | Comment | Detail | Approx. Emissions Saved | | Low Emission Points<br>Based on EPS' Recommendation |
|---|---|---|---|---|---|
| | | | $NO_x$ (mg/ kWh) | $CO_2$ (kg per unit/year) | |
| Site layouts & proximity of housing to roads | Although not a specific requirement of air quality policy, design layouts which reduce exposure of receptors to pollutants are preferable, particularly in terms of proximity of housing to busy roads. | | <0.01 | N/A | 1 |
| Sealed fascias/active (artificial) ventilation or active air filtration (NOx filters etc.) | Only to be used in cases where few other options are available, for example, only in very sensitive areas and around AQMAs, or for other reasons such as noisy areas. | | <0.1 | N/A | 1 |
| Building Design | Favourable design measures include designs to avoid the creation of tight/tall streets (canyons) & increasing sustainable/well-insulated building design. | | 110 | 2850 | 3 |

### 4) Construction Phase

| Low Emission Measure | Comment | Approx. Emissions Saved | | Low Emission Points<br>Based on EPS' Recommendation |
|---|---|---|---|---|
| | | NOx | $CO_2$ | |
| Construction Vehicles | All commercial road vehicles used on the construction project must meet the European Emission Standards (commonly known as Euro standards) of Euro 5 during any works that take place.<br><br>All non-road mobile vehicles with compression ignition engines used within the site must comply with emission standards set in EC directive 97/68/EC. Vehicles must meet Stage IIIa and b emission limits.<br><br>Any diesel-powered machines used on, or otherwise serving the site, must be run on ultra-low sulphur diesel (also known as ULSD 'cleaner diesel' or 'green diesel'). "Ultra-low sulphur diesel" means fuel meeting the specification within BS EN 590. | 6500 (mg/kWh) | | 1 |
| Construction Road Layout | Favourable design measure including speed restrictions & traffic management. | 20%*** | 20%*** | 1 |
| Construction Environmental Management Plan (CEMP) | A CEMP would cover impacts to air quality mainly associated with dust and odour. The CEMP will also cover more general environmental health issues such as noise and light pollution.<br><br>Site activities include plant emissions – switch-off policy, plant maintenance & alternative fuel use. | 40%*** | 40%*** | 1 |

***A precise number of emissions saved cannot be calculated as each project will emit different levels of $NO_x$ and $CO_2$ due to varying scope and size.

# APPENDIX F

# Low Emission Design – Inventory Calculations

# Calculations for Low Emission Design:

## Definitions and abbreviations:

**CHP = Combined Heat & Power**

**$CO_2e$ = Carbon Dioxide equivalent**
All gaseous emissions are converted to the amount of $CO_2$ needed to create the same effect from other emissions including $NO_x$, methane, $SO_x$ etc.

**DERV = Diesel Engine Road Vehicle**

**GCV = Gross Calorific Value**
The gross calorific value (Ho or Hs) is the energy released during a complete combustion when the flue gas is cooled back to the reference temperature at a constant pressure and the entire quantity of water produced is condensed. The gross calorific value therefore also contains the condensation heat, also referred to as “latent heat”.

**HEPR = Home Energy Performance Ratio**

**NCV = Net Calorific Value**
The net calorific value is the energy released during a full combustion when the flue gas is cooled back to the reference temperature at a constant pressure. In this case the water vapour produced during combustion remains in gaseous form. The net calorific value therefore only specifies the quantity of sensible heat in the flue gases and is directly related to temperature, and not the quantity of condensation heat bound in the water vapour.

## 1. Low Emission Private Transport & Travel Planning

| Low Emission Measure | Detail | Explanation | $NO_x$ emissions saved | $CO_2e$ emissions saved | Units |
|---|---|---|---|---|---|
| **Low Emission Vehicle Support** | Superfast EV charging point | Assume 2400km km of range provided per day (5 hrs at 480 km/hr) | 262.8 | 1550.52 | kg per charging point/year |
| | Rapid EV charging point | Assume 1152 km of range provided per day (6 hrs at 192 km/hr) | 126.14 | 744.25 | kg per charging point/year |
| | Fast EV charging point | Assume 192km of range provided per day (4 hrs at 48 km/hr) | 21.02 | 124.04 | kg per charging point/year |
| | Slow EV charging point | Assume 48 km of range provided per day (2 hrs at 24 km/hr) | 5.26 | 31.01 | kg per charging point/year |
| | Hydrogen Fuel Cell charging point | Assume only 10% of vehicles in area would be Hydrogen Fuel Cell | 0.141 | 0.833 | kg per household/year |
| | Wiring for future upgrade to EV charging | Assume 1 vehicle per household with charger is an EV | 3.29 | 19.38 | kg per household/year |
| **Travel Plans & Car Share Schemes** | Secure cycle racks with EV charging facilities | Estimating 20% of local residents will choose lower emission transport | <0.001 | <0.001 | kg per household/year |
| | Dedicated cycle ways | | | | |
| | Travel planning aids | | | | |
| | Minimal car parking provision | | | | |
| | Measures discouraging car use | | | | |
| | Provision of low emission pool car | | | | |
| | Measures encouraging casual cyclists | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Public Transport Infrastructure** | Bus stops, guided busways, train stations etc. | Estimating 50% of local residents will choose public transport | N/A | N/A | kg per household/year |

**Petrol and diesel car $NO_x$ emissions in 2020:**

| Pollutant | Source | Vehicle emissions (g/km) |
|---|---|---|
| **$NO_x$** | Petrol cars | 0.1 |
| | DERV cars | 0.5 |

**Source:** UK Informative Inventory Report (1990 to 2020), Ricardo Energy & Environment, March 2022

**Assume average distance travelled of 10km per trip**

Source: Land-Use Planning & Development Control: Planning for Air Quality, Institute of Air Quality Management, January 2017

**Assume average trips per day of 3 trips**

**Source:** Assumption

**$CO_2e$ emissions for all domestic transport: 122 metric tonnes**

**Source:** Transport and environment statistics: Autumn 2021, Department for Transport, 2021 Transport and environment statistics: Autumn 2021 - GOV.UK (www.gov.uk)

**Cars and taxis made up 68% of all domestic emissions in 2019, which totalled 82.96 metric tonnes $CO_2e$**

**Source:** Transport and environment statistics: Autumn 2021, Department for Transport, 2021 Transport and environment statistics: Autumn 2021 - GOV.UK (www.gov.uk)

**Total petrol and diesel car vehicle km in 2019: 467,400,000,000km**

**Source:** UK Informative Inventory Report (1990 to 2020), Ricardo Energy & Environment, March 2022

**$CO_2e$ emissions from petrol and diesel cars in 2019 = 1.77g/km**

**Disclaimer:** $CO_2$ equivalent includes all pollutants found in car exhaust fumes, which includes $NO_x$

**Emissions saved from hydrogen fuel cell vs. combustion engines: 43%**

**Source:** Road to Zero, Department for Transport, 2018

## 2. Energy Efficiency of Built Environment

**$NO_x$**

| Low Emission Measure | Detail | | Explanation | Calculation of $NO_x$ emissions saved (mg/kWh) |
|---|---|---|---|---|
| **Building Sustainability** | BREEAM Rating | Outstanding | Assuming $NO_x$ Class 3 gas-fired heating would be installed as standard | 110 |
| | | Excellent | Assuming $NO_x$ Class 3 gas-fired heating would be installed as standard | 80 |
| | | Pass/Very Good | Assuming $NO_x$ Class 3 gas-fired heating would be installed as standard | 50 |
| | Home Quality Mark | | Assuming $NO_x$ Class 3 gas-fired heating would be installed as standard | 126 |
| | Insulation, cavity wall insulation, double-glazing etc. | | Assume these measures will improve home heat efficiency by 20% | 30 |
| **Renewables** | | | 100% electricity from local renewable source | 150 |
| **Biomass Boilers** | | | Assume lowest emission is 70 g/GJ, compared against $NO_x$ Class 3 gas-fired heating | -102 |
| **Air-source/ground-source heat pumps** | No emission saving information currently available. | | – | – |
| **Combined Heat & Power / Boiler Efficiency** | Boiler efficiency | | Assuming a Class 3 gas-fired heating would be installed as standard | 110 |
| | CHP | | Assume the use of a gas turbine with heat recovery boiler replacing $NO_x$ Class 3 boiler | -950 |

**BSEN15502 Standard $No_x$ concentration classes for gas-fired heating boilers**

| $NO_x$ class | $NO_x$ concentration limit (mg/kWh) | |
|---|---|---|
| **Class 1** | 260 | NCV |
| **Class 2** | 200 | |
| **Class 3** | 150 | |
| **Class 4** | 100 | |
| **Class 5** | 70 | |
| **Class 6** | 56 | GCV |

**Source:** Domestic Boiler Emission Testing, Greater London Authority, November 2018

### BREEAM $NO_x$ Emissions Assessment Criteria

| BREEAM Rating | $NO_x$ emissions limit from heating and hot water system (mg/kWh) |
|---|---|
| **Pass/Very Good** | ≤100 |
| **Excellent** | ≤70 |
| **Outstanding** | ≤40 |

**Source:** BREEAM Refurbishment Domestic Buildings Technical Manual, 2014

### Maximum $NO_x$ boiler emissions under Home Quality Mark: 24 mg/kWh

**Source:** Home Quality Mark ONE Technical Manual, Home Quality Mark, 2018

### $NO_x$ emissions from biomass boilers

| Heat input (g/gj) | $NO_x$ emissions output (mg/kWh) |
|---|---|
| 70 | 252 |
| 150 | 542 |

**Source:** Measurement of the in-situ performance of solid biomass boilers, Department for Business, Energy & Industrial Strategy, 2019

**$NO_x$ emissions for CHP systems**

| CHP system type and fuel used to power | $NO_x$ emissions in mg/kWh) |
|---|---|
| Gas turbine with heat recovery boiler – Natural gas | 1100 |
| Gas turbine with heat recovery boiler and back-pressure steam turbine – Natural gas | 900 |
| Boiler and back-pressure steam turbine – Natural gas | 1500 |
| Boiler and back-pressure steam turbine – Heavy Fuel Oil | 5300 |
| Boiler and back-pressure steam turbine – Coal | 5200 |
| Compression ignition engine with heat recovery boiler – Natural gas | 7500 |
| Compression ignition engine with heat recovery boiler – Heavy Fuel Oil | 11500 |
| Lean-burn spark-ignition engine with heat recovery boiler – Natural gas | 3000 |

**Average $NO_x$ emissions from CHP system: 3850 mg/kWh**

**Source:** Combined Heat and Power – Environmental, Department for Business, Energy & Industrial Strategy, 2021

## $CO_2$

| Low Emission Measure | Detail | | Explanation | Calculation of $CO_2$ emissions saved (kg/household/year) |
|---|---|---|---|---|
| **Building Sustainability** | BREEAM Rating | Outstanding | 55% average $CO_2$ emissions saving | 2872.37 |
| | | Excellent | 35% average $CO_2$ emissions saving | 1827.87 |
| | | Pass/Very Good | 15% average $CO_2$ emissions saving | 783.37 |
| | Home Quality Mark | | Highest HEPR is carbon neutral | 5222.48 |
| | Insulation, cavity wall insulation, double-glazing etc. | | Assume these measures will improve home heat efficiency by 20% | 1044.50 |
| **Renewables** | | | 100% electricity from local renewable source | 5222.48 |
| **Biomass Boilers** | | | Assume same emissions saving factor as $NO_x$ (46%) | 2402.34 |
| **Air-source/ground-source heat pumps** | No emission saving information currently available. | | | |
| **Combined Heat & Power/ Boiler Efficiency** | Boiler efficiency | | Assume maximum $CO_2$ saving of 50% | 2611.24 |
| | CHP | | Maximum 30% emissions saving | 1566.74 |

**Average $CO_2$ emissions savings associated with different BREEAM ratings**

| BREEAM Rating | Average $CO_2$ emissions savings |
|---|---|
| Outstanding | 55% |
| Excellent | 35% |
| Very good | 15% |
| Good | 5% |

**Source:** Assessing Carbon Emissions in BREEAM, BREEAM, 2015

**$CO_2$ emissions generated directly from households in the UK: 143 million tonnes**
**Source:** Carbon Footprint for the UK and England to 2019, Department for Environment, Food & Rural Affairs, 2022
**Number of households in UK in 2019: 27.8 million**
Source: Families and households in the UK: 2019, Office for National Statistics, 2019: Carbon footprint for the UK and England to 2019 - GOV.UK (www.gov.uk)
**Average $CO_2$ emissions per household per year in UK: 5.14 million tonnes**

**Maximum $CO_2$ emissions saving of switching to CHP: 30%**
**Source:** Combined Heat and Power guidance, Department for Business, Energy & Industrial Strategy, 2020

## 3. Optimised Development

| Low Emission Measure | Explanation | $NO_x$ emissions saved (mg/kWh) | $CO_2$ emissions saved (kg per household/year) |
|---|---|---|---|
| **Site layout and proximity to roads** | Assume savings from roadside levels to background levels | <0.01 | N/A |
| **Active ventilation/air filtration** | Assume air filter works consistently at maximum efficiency | <0.1 | N/A |
| **Building design** | Assume buildings achieve the highest BREAAM rating | 110 | 2872.4 |

### $NO_x$

**Increase in $NO_x$ concentrations between Urban Background and Urban Traffic monitoring sites in the UK**

| Monitoring site type | Mean $NO_x$ concentration (µg/m³) | | | | | |
|---|---|---|---|---|---|---|
| | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** |
| Urban Background | 23.323 | 21.742 | 20.002 | 19.564 | 15.067 | 15.844 |
| Urban Traffic | 37.648 | 33.677 | 32.800 | 31.079 | 22.926 | 24.795 |
| Increase in $NO_x$ concentration in Urban Traffic compared to Urban Background (%) | 61.422 | 54.895 | 63.979 | 58.861 | 52.158 | 56.490 |

**Source:** Concentration of nitrogen dioxide, Department for Environment, Food & Rural Affairs, 2022, https://www.gov.uk/government/statistics/air-quality-statistics/ntrogen-dioxide

**Average percentage increase between Urban Traffic monitoring sites and Urban Background sites: 57.97%**

| Monitoring site type | Mean $NO_x$ concentration (µg/m³) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 5-year average |
| Urban Background | 23.323 | 21.742 | 20.002 | 19.564 | 15.067 | 15.844 | 19.257 |
| Urban Traffic | 37.648 | 33.677 | 32.800 | 31.079 | 22.926 | 24.795 | 30.487 |

**Source:** Concentration of nitrogen dioxide, Department for Environment, Food & Rural Affairs, 2022, https://www.gov.uk/government/statistics/air-quality-statistics/ntrogen-dioxide

**Mg/m³ to mg/kWh conversion factor: 0.857**

**Source:** BREEAM Refurbishment Domestic Buildings Technical Manual, 2014

**Average urban background $NO_x$ concentration between 2016 and 2021 in the UK converted to mg/kWh: 0.0165 mg/kWh**

**Average urban traffic $NO_x$ concentration between 2016 and 2021 in the UK converted to mg/kWh: 0.0261 mg/kWh**

**Average emissions reduction while using indoor air filtration system: 70%**

**Source:** Indoor Air Quality Report, Camfil, 2015

## 4. Construction Phase

| Low Emission Measure | Explanation | $NO_x$ emissions saved | $CO_2$ emissions saved |
|---|---|---|---|
| **Construction Vehicles** | Assume standard of Stage I, improved to Stage IIIA | 6500 mg/kWh | |
| **Construction Road Layout** | Assume maximum reduction in emissions is 20% | Approximately 20% | Approximately 20% |
| **Construction Environmental Management Plan (CEMP)** | Assume maximum reduction in emissions (mainly dust) is 40% | Approximately 40% | Approximately 40% |

**Emission limits from Stage I to Stage V for hydrocarbon and $NO_x$**

| Emission Standard | Limit for hydrocarbon and $NO_x$ emission (mg/kWh) |
|---|---|
| Stage I | 10500 |
| Stage II | 7000 |
| Stage IIIA | 4000 |
| Stage IIIB | 2000 |
| Stage IV | 50 |
| Stage V | 50 |

**Source:** European Stage V Non-Road Emission Standards, International Council on Clean Transportation, 2016

7B Caxton House
Broad Street
Cambourne
Cambridge CB23 6JN

**T** +44(0) 1954 710666
**E** info@epstrategies.co.uk
**W** www.epstrategies.co.uk

Registered Number: 4330320