- Information on public transport services in the vicinity of the site; and
- Information on the opportunities to walk and cycle to the site.

9.4 This information will also be permanently displayed on notice boards within each unit and will be updated, by the TPC, on a regular basis to ensure that it remains accurate.

9.5 Included within this information pack will be access routes to and from the site and these are shown in **Figure 2.**

*Measures to Encourage Walking*

9.6 Travel to the site on foot will be actively promoted by the TPC, in liaison with the developer and planning authority. The TPC will also investigate the potential for introducing incentives for employees to walk to the site ensuring that footpaths on the site are well maintained.

9.7 Specific measures to encourage walking to the Site are discussed below.

- Footway connections to local facilities including A3/A5 outlets at Baynards Green Services;
- Footway/cycleway connections to Bicester;
- Secure changing and shower facilities will be provided within each unit;
- Demand for facilities will be monitored through the staff travel survey and new facilities provided as necessary;
- Information and advice concerning safe pedestrian routes to the site will be available to employees;
- The TPC will raise awareness of the health benefits of walking through promotional material; and
- Maps providing safe walking routes indicating distances and times to the most common destinations near to the work place (such as local bus stops).

*Measures to Encourage Cycling*

9.8 To encourage cycling to the Site the following measures have or will be introduced and marketed by the TPC:

- A dedicated cycle route to Bicester;
- Sheltered and secure cycle parking will be located within each unit;
- Information and advice concerning safe cycle routes to the site will be available to employees;
- The TPC will try to negotiate discounts from cycle shops for staff to purchases a bicycle, the necessary safety equipment and waterproof clothing to enable them to commute to work by cycle;
- The TPC will investigate the initiation of a Bicycle User Group (BUG) to support staff that commute by cycle and to encourage others to do so;
- The TPC will establish contacts with the cycling officers of OCC to ensure input to the further development of any existing cycling strategy in the vicinity of the proposed development and
- The TPC will ensure that the cycle stores and changing facilities that are in place are adequate and maintained.

*Measures to Encourage the Use of Public Transport*

9.9 A bus service between the Site and Bicester will be secured by contribution as part of the wider development.

9.10 To make employees aware of and encourage the use of public transport to access the site the following measures will be included within the Travel Plan for each unit:

- Details of relevant bus services will be prominently displayed for the information of employees.

- The TPC will liaise with the bus service operators to ensure that up-to-date timetable and route information is displayed
- The TPC will contact local bus operators to find out whether discounted ticketing initiatives are available; and
- The TPC will seek to encourage the use of public transport.

9.11 **Table 3** below shows the bus services and frequencies local to the Site. There are three bus services which run within close proximity to the proposed site including 505. Provision has been made for bus stops within the Site which are easily accessible.

**Table 3 – Bus Services and Frequency**

| Service | Operator | Route | Frequency | | |
|---|---|---|---|---|---|
| | | | Monday-Friday | Saturday | Sunday |
| 505 | Stagecoach | Bicester - Brackley | Every 30 minutes | Every 30 minutes | No service |

9.12 The use of public transport apps or websites such as Traveline or Oxontime will be actively encouraged through the Travel Plan.

*Measures to Encourage the Use of Taxis*

9.13 More specifically aimed at visitors the following measures are designed to encourage use of taxis to access the site:

- The TPC will ensure the provision of contact details of suitably regulated local taxi operators to be prominently displayed for the information of employees; and
- Taxis will be booked for visitors on departing the site.

*Measures to Encourage Car Sharing*

9.14 Car sharing schemes are an advanced internet based journey matching system that allows users to search for suitable people to share regular journeys with. The use of Oxfordshire's car sharing database (link: https://oxfordshire.liftshare.com/) will be promoted to employees. Car sharers may be given preferential treatment for parking. Employers will be encouraged to provide a guaranteed lift home service in emergencies for car sharers. In addition the

guaranteed lift home service could be extended to cater for 'emergency' or 'short notice' situations for staff that cycle or walk to the site.

9.15 Car sharing will be encouraged through the Liftshare car database. Further details can be found at: https://liftshare.com/uk/community/oxfordshire.

9.16 The aims of the scheme include reducing traffic congestion within Oxfordshire; reducing the day-to-day expense of travelling; and reducing the traffic pollution effects on the environment.

*Other Measures*

9.17 The scheme will provide electric vehicle charging infrastructure which will be evenly distributed across the Site.

9.18 Provision will be made for electric car and HGV parking as set out below:

- 10% of car parking spaces will have active electric charging provision
- 10% of HGV parking spaces will have active electric charging provision
- 15% of car parking spaces will have passive electric charging provision
- 15% of HGV parking spaces will have passive electric charging provision

## 10.0 ACTION PLAN

10.1 The TPC will provide an Action Plan, see draft Action Plan in **Appendix B**, which will monitor the progress of Travel Plan and timescales. The full Travel Plan will be based upon the principles laid down in this Framework Travel Plan and the Action Plan.

10.2 The TPC will also liaise with OCC and report any results that are achieved from the Action Plan and travel survey.

## 11.0 TRAVEL DATABASE

11.1 As discussed above, the TPC will produce and maintain a staff travel database. Six months after occupying a unit, the appointed TPC will obtain travel data by issuing the staff with a questionnaire survey.

11.2 Specifically, the Employee Travel Survey will include the following:

- postcode area of residence;
- normal working hours;
- mode of travel to work;
- car ownership and company car benefits;
- work related travel throughout the day;
- reasons for driving;
- driving commitments i.e. taking children to school etc;
- reasons for not using public transport and other modes;
- measures that would encourage car sharing, use of public transport or other non-car modes;
- staff, profile including age, gender etc

11.3 All data collected in connection with the Travel Plan will be subject to the provisions of the Data Protection Act and will only be released to OCC. However, in the interests of security, names and addresses of staff will not be provided, rather, postcode details of staff would be supplied.

11.4 Information contained within the database and the travel patterns derived from the data will inform the annual review process which will be carried out in conjunction with OCC.

## 12.0 TRAVEL PLAN PROMOTION

12.1 It is very important that new employees are fully aware of the existence and benefits of the Travel Plan when they begin working at the Site and that they are effectively "signed up" to the potential benefits it brings as soon as possible. To this end, the Travel Plan will be presented and promoted to the staff as a challenge rather than as a chore.

12.2 All employees will be informed of the existence of the Travel Plan. The details of the Travel Plan, including its objectives, the potential benefits for both individuals and for the environment, and the means by which it will operate, will be fully explained.

12.3 New employees will be informed about the Travel Plan prior to the commencement of their employment, the inclusion of relevant material in their induction pack and a Staff Travel Survey form will be distributed at the recruitment stage. This will be issued either in paper or electronic format. It will also contain any details of incentives offered to encourage sustainable travel to and from the site for example, a cycle to work scheme.

12.4 Information relating to the Travel Plan will be displayed in a prominent location (or locations) where it will be easily accessible to employees, such as a notice board in the main reception area.

12.5 Other means of promoting the Travel Plan will also be investigated, which might take the form of staff newsletters and notice boards. Staff will also be encouraged to familiarise themselves with the Travel Plan.

12.6 The Travel Plan document will be available for inspection by employees. Information on the progress of the Travel Plan, including the results of the annual review, will be communicated to employees through the information displays and other means as appropriate.

12.7 The TPC will engage, from time to time, with OCC, in its travel awareness raising events.

## 13.0 TRAVEL PLAN MONITORING AND REVIEW

13.1 A formalised program of monitoring will be established to enable indicators of the success of the Travel Plan to be recorded at regular intervals within 3 months of occupation. The Travel Plan targets and measures will be reviewed considering the survey results.

13.2 Following the initial travel surveys, biennial monitoring surveys will be undertaken for a minimum of 5 years, i.e. surveys will be in years 1, 3 and 5.

13.3 The survey results will be sent to the Travel Plan team at OCC within 1 month of survey completion.

13.4 Other information about the impact of the Travel Plan is less easily quantified but should be recorded as part of ongoing monitoring. These include:

- The level of enquiry and take-up of the car-sharing scheme;
- The take-up of any ticketing incentives for public transport services; and
- Any formal or informal comments made by employees regarding the operation of the Travel Plan.

## 14.0 PLAN ADMINISTRATION

14.1 A copy of the full Travel Plan will be supplied to nominated officers of the planning and highway authorities at the time of initiation. Copies will also be issued to the developer, for reference and for display.

14.2 The TPC will be responsible for keeping all records associated with the maintenance of the Plans including the employee databases and all relevant correspondence and records of all monitoring exercises. The Travel Plan files will be available for inspection by the planning and highway authorities at any time, subject to prior notice.

14.3 A change in the identity of the nominated TPC will be notified in writing to the planning authority.

## 15.0 CONSULTATION

15.1 The success of the Travel Plan will rely on the support of employees and visitors. Regular consultation will be critical to the ongoing success of the Travel Plan.

15.2 The mechanism for consultation with employee representatives will be formalised and proposals submitted to the planning authority for approval.

15.3 Regular liaison with the bus operators and Council officers responsible for public transport, cycling and strategic transport will also be necessary. A system of on-going liaison with the planning authority will be agreed prior to initiation of the Travel Plan.

15.4 The Travel Plan documents will include a contact list of nominated representatives from each of the operators and authorities. Amendments to nominated contact personnel will be notified to the TPC and/or the planning authority and the document shall be amended accordingly.

# Appendix A

## Indicative Masterplan

ILLUSTRATIVE MASTERPLAN (1:2500 @ A1)

cornisharchitects

# 20005 JUNCTION 10 M40
# ILLUSTRATIVE MASTERPLAN

SITE VISUAL 01

SITE VISUAL 02

SITE VISUAL 03

SITE VISUAL 04

PRECEDENT STUDIES







**Appendix B**

**Action Plan**

# M40 Junction 10 – Action Plan - Travel Plan Framework

| Action | Responsibility | Time Scale | Comments |
|---|---|---|---|
| **Prior to Occupation** | | | |
| Obtain Approval to Travel Plan Framework | DTA | Planning Submission | |
| Prepare and submit a full Travel Plan | TPC to arrange | Within 3 months of occupation of premises. | A Full Travel Plan should be submitted by the occupier of each unit, including initiatives and targets specific to the unit occupier, in consultation with Oxfordshire County Council |
| Collate sustainable travel information | TPC | Within 3 months of occupation of premises. | TPC to obtain bus timetables, bus, cycle and walking maps and taxi contacts from Oxfordshire County Council and include in Welcome Pack and display on noticeboard |
| Establish a sustainable travel noticeboard / area | TPC | Within 3 months of occupation of premises. | Should be located in a prominent position and available to both staff and visitors |
| Ensure sustainable travel facilities are located in prominent locations and clearly signed | Developer / Contractor | Within 3 months of occupation of premises. | Pedestrian routes, cycle parking, car share spaces should be well advertised and clearly signed |
| **Post Occupation** | | | |
| Issue Welcome Packs to all employees moving to the premises | TPC | At recruitment stage | |
| Route maps, bus timetables, taxi contacts to be available at all times for staff and visitors | TPC | At occupation of premises. | Information to be updated regularly. |
| Sustainable travel information to be made available to visitors to the site | TPC | At occupation of premises. | Links to journey planning websites to be made available on occupier websites (e.g. on a 'Find Us' page) |
| Ensure that employees are made aware of the Travel Plan during the recruitment process. | Recruitment Team | At occupation of premises and on-going | |
| Issue Staff Travel Survey | TPC | Within 3 months of occupation of premises | |
| Set up and maintain an employee travel database | TPC | Within 6 months of occupation of premises | To contain results of Staff Travel Survey for target-setting and monitoring purposes |
| Set up car sharing database / join existing scheme | TPC/Individual Colleagues | Within 6 months of occupation of premises | Provide details of car sharing schemes such as Liftshare |
| Discuss and brief employees on the emergency lift home procedure for car-sharers | TPC | Within 6 months of occupation of premises | |
| Set up a **B**icycle **U**sers **G**roup | TPC | Within 6 months of occupation of premises | To promote cycling, offer support, encourage others, discuss problems etc. |
| Contact local cycle shops to offer possible financial assistance / benefits to purchase a cycle | TPC | Within 6 months of occupation of premises | i.e. Interest free loan / discounts |
| **Monitoring / Review** | | | |
| Include motivation, support and reward issues in staff newsletter. | TPC | On-going Review every 12 months | |
| Consider offering incentives for sustainable travel | TPC | On-going Review every 12 months | e.g. prize draws |
| Promote Cycling, advertising the health benefits and savings to be made. | TPC | Spring -Summer | Display health benefits promotional material and offer maps, cycle routes, information |
| Organise Cycle to Work events. | TPC | Spring -Summer | Offer incentives e.g., breakfast/give aways, promote National Bike Week in June |
| Promote Car Sharing and Public Transport and the cost benefits involved. | TPC | Autumn -Winter | Re-issue information on car sharing schemes such as Liftshare. |
| Meet with Oxfordshire County Council to discuss progress of Travel Plan | TPC | Every 12 months | Consult with Oxfordshire County Council |
| Undertake Staff Travel Surveys | TPC | Biennial (1, 3 and 5 years) | Monitor staff travel behaviour and use of sustainable travel facilities and initiatives (e.g. cycle parking, motorcycle parking, demand for car parking, bus service occupancy and car share scheme) |
| Analyse results of Staff Travel Survey and implement appropriate actions | TPC | Review after each survey | Monitor progress of Travel Plan. Monitor requests by employees for additional facilities to assist sustainable travel (e.g. provision of cycle parking, lockers, showers etc.) |

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# Appendices 9.1 – 9.6

## AIR QUALITY APPENDICES

Air Quality CONSULTANTS

# Environmental Statement Appendices: Chapter 9: Air Quality

Land at J10, M40

August 2021

Experts in air quality management & assessment

AIR QUALITY CONSULTANTS - CELEBRATING 25 YEARS -

## Document Control

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| **Client** | Albion Land | **Principal Contact** | Alistair Walker (Quod) |

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| **Report Prepared By:** | Tom Richardson |

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## Appendices



## Tables



## Figures

# 9.1 Legislation and Policy Context

9.1.1 All European legislation referred to in this report is written into UK law and remains in place, although there is uncertainty at this point in time as to who will enforce the requirements of some of this legislation.

## Air Quality Strategy

9.1.2 The Air Quality Strategy (Defra, 2007), published under the Environment Act 1995 by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

## Clean Air Strategy 2019

9.1.3 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

## Reducing Emissions from Road Transport: Road to Zero Strategy

9.1.4 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

9.1.5 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has since announced that the phase-out date for the sale of new petrol and diesel cars and vans will be brought forward to 2030 and that all new cars and vans must be fully zero emission at the tailpipe from 2035. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

## Planning Policy

### *National Policies*

9.1.6 The National Planning Policy Framework (NPPF) (2021) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:

*"to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".*

9.1.7 To prevent unacceptable risks from air pollution, Paragraph 174 of the NPPF states that:

*"Planning policies and decisions should contribute to and enhance the natural and local environment by…preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality".*

9.1.8 Paragraph 185 states:

*"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".*

9.1.9 More specifically on air quality, Paragraph 186 makes clear that:

*"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. 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".*

9.1.10 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

*"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified".*

9.1.11 Regarding plan-making, the PPG states:

*"It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality".*

9.1.12 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan "*identifies measures that will be introduced in pursuit of the objectives and can have implications for planning*". In addition, the PPG makes clear that *"Odour and dust can also be a planning concern, for example, because of the effect on local amenity".*

*9.1.13* Regarding the need for an air quality assessment, the PPG states that:

*"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity".*

9.1.14 The PPG sets out the information that may be required in an air quality assessment, making clear that:

*"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".*

9.1.15 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

*"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented".*

### *Local Policies*

9.1.16 The Cherwell Local Plan 2011 – 2031 (Cherwell District Council, 2015) sets out planning policy within Cherwell District. Within this plan, Policy ESD10 'Protection and Enhancement of Biodiversity and the Natural Environment' concerns air quality and states the following:

*"Protection and enhancement of biodiversity and the natural environment will be achieved by the following…*

*If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or as a last resort, compensated for, then development will not be permitted…*

*Air quality assessments will also be required for development proposals that would be likely to have a significantly adverse impact on biodiversity by generating an increase in air pollution."*

9.1.17 In addition, a number of Saved Policies from the Cherwell Adopted Local Plan 1996 (Cherwell District Council, 1996) remain relevant to planning decisions. Policy ENV1 concerns pollution control, and states the following:

*"Development which is likely to cause materially detrimental levels of noise, vibration, smell, smoke, fumes or other type of environmental pollution will not normally be permitted."*

9.1.18 Furthermore, Policy TR10 concerns heavy good vehicles and includes provisions relating to their effect on residential areas:

*"Development that would generate frequent heavy goods vehicle movements through residential areas or on unsuitable urban or rural roads will not be permitted. The Council will resist proposals for the establishment of heavy goods vehicle operating centres where they would create traffic problems or adversely affect the amenity of residential areas or villages."*

## Air Quality Action Plans

### *National Air Quality Plan*

9.1.19 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017

Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a CAZ. There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in the modelling undertaken for this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the limit values that are the focus of the Air Quality Plan.

### *Local Air Quality Action Plan*

9.1.20 Cherwell District Council's Air Quality Action Plan (Cherwell District Council, 2017) sets out a series of measures by which they will seek to achieve the air quality objectives in their AQMAs. The Plan includes a number of general measures across the district which will seek to improve air quality, including Measure G.2:

*"All major developments to include Emission statements and mitigation strategies within an appropriate air quality assessment submitted at the application stage."*

9.1.21 The Plan also contains a number of others measures relevant to the individual AQMAs which are no relevant to the assessment.

## 9.2 Construction Dust Assessment Procedure

9.2.1 The criteria developed by IAQM (2016) divide the activities on construction sites into four types to reflect their different potential impacts. These are:

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

9.2.2 The assessment procedure includes the four steps summarised below:

### STEP 1: Screen the Need for a Detailed Assessment

9.2.3 An assessment is required where there is a human receptor within 350 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), or where there is an ecological receptor within 50 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

9.2.4 Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is *negligible* and that any effects will be 'not significant'. No mitigation measures beyond those required by legislation will be required.

### STEP 2: Assess the Risk of Dust Impacts

9.2.5 A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude (Step 2A); and
- the sensitivity of the area to dust effects (Step 2B).

9.2.6 These two factors are combined in Step 2C, which is to determine the risk of dust impacts with no mitigation applied. The risk categories assigned to the site may be different for each of the four potential sources of dust (demolition, earthworks, construction and trackout).

#### *Step 2A – Define the Potential Dust Emission Magnitude*

9.2.7 Dust emission magnitude is defined as either 'Small', 'Medium', or 'Large'. The IAQM guidance explains that this classification should be based on professional judgement, but provides the examples in Table 9.2.1.

**Table 9.2.1: Examples of How the Dust Emission Magnitude Class May be Defined**

| Class | Examples |
|---|---|
| **Demolition** | |
| **Large** | Total building volume >50,000 $m^3$, potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >20 m above ground level |
| **Medium** | Total building volume 20,000 $m^3$ – 50,000 $m^3$, potentially dusty construction material, demolition activities 10-20 m above ground level |
| **Small** | Total building volume <20,000 $m^3$, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months |
| **Earthworks** | |
| **Large** | Total site area >10,000 $m^2$, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes |
| **Medium** | Total site area 2,500 $m^2$ – 10,000 $m^2$, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes |
| **Small** | Total site area <2,500 $m^2$, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10,000 tonnes, earthworks during wetter months |
| **Construction** | |
| **Large** | Total building volume >100,000 $m^3$, piling, on site concrete batching; sandblasting |
| **Medium** | Total building volume 25,000 $m^3$ – 100,000 $m^3$, potentially dusty construction material (e.g. concrete), piling, on site concrete batching |
| **Small** | Total building volume <25,000 $m^3$, construction material with low potential for dust release (e.g. metal cladding or timber) |
| **Trackout** [a] | |
| **Large** | >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m |
| **Medium** | 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m |
| **Small** | <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m |

[a] These numbers are for vehicles that leave the site after moving over unpaved ground.

### *Step 2B – Define the Sensitivity of the Area*

9.2.8 The sensitivity of the area is defined taking account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of $PM_{10}$, the local background concentration; and
- site-specific factors, such as whether there are natural shelters to reduce the risk of wind-blown dust.

9.2.9 The first requirement is to determine the specific sensitivities of local receptors. The IAQM guidance recommends that this should be based on professional judgment, taking account of the principles in Table 9.2.2. These receptor sensitivities are then used in the matrices set out in Table 9.2.3, Table 9.2.4 and Table 9.2.5 to determine the sensitivity of the area. Finally, the sensitivity of the area is considered in relation to any other site-specific factors, such as the presence of natural shelters etc., and any required adjustments to the defined sensitivities are made.

### *Step 2C – Define the Risk of Impacts*

9.2.10 The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the *risk* of impacts with no mitigation applied. The IAQM guidance provides the matrix in Table 9.2.6 as a method of assigning the level of risk for each activity.

## STEP 3: Determine Site-specific Mitigation Requirements

9.2.11 The IAQM guidance provides a suite of recommended and desirable mitigation measures which are organised according to whether the outcome of Step 2 indicates a low, medium, or high risk. The list provided in the IAQM guidance has been used as the basis for the requirements set out in Appendix 9.5.

## STEP 4: Determine Significant Effects

9.2.12 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant'.

9.2.13 The IAQM guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be 'not significant'.

**Table 9.2.2: Principles to be Used When Defining Receptor Sensitivities**

| Class | Principles | Examples |
|---|---|---|
| **Sensitivities of People to Dust Soiling Effects** | | |
| **High** | users can reasonably expect enjoyment of a high level of amenity; or<br>the appearance, aesthetics or value of their property would be diminished by soiling; and 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 | dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms |
| **Medium** | 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; or<br>the appearance, aesthetics or value of their property could be diminished by soiling; or<br>the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land | parks and places of work |
| **Low** | the enjoyment of amenity would not reasonably be expected; or<br>there is property that 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 | playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads |
| **Sensitivities of People to the Health Effects of $PM_{10}$** | | |
| **High** | locations where members of the public may be exposed for eight hours or more in a day | residential properties, hospitals, schools and residential care homes |
| **Medium** | locations where the people exposed are workers, and where individuals may be exposed for eight hours or more in a day. | may include office and shop workers, but will generally not include workers occupationally exposed to $PM_{10}$ |
| **Low** | locations where human exposure is transient | public footpaths, playing fields, parks and shopping streets |
| **Sensitivities of Receptors to Ecological Effects** | | |
| **High** | 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 | Special Areas of Conservation with dust sensitive features |
| **Medium** | 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 | Sites of Special Scientific Interest with dust sensitive features |
| **Low** | locations with a local designation where the features may be affected by dust deposition | Local Nature Reserves with dust sensitive features |

**Table 9.2.3: Sensitivity of the Area to Dust Soiling Effects on People and Property [1]**

| Receptor Sensitivity | Number of Receptors | Distance from the Source (m) | | | |
|---|---|---|---|---|---|
| | | <20 | <50 | <100 | <350 |
| 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 |

[1] For demolition, earthworks and construction, distances are taken either from the dust source or from the boundary of the site. For trackout, distances are measured from the sides of roads used by construction traffic. Without mitigation, trackout may occur from roads up to 500 m from sites with a *large* dust emission magnitude for trackout, 200 m from sites with a *medium* dust emission magnitude and 50 m from sites with a *small* dust emission magnitude, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

**Table 9.2.4: Sensitivity of the Area to Human Health Effects [1]**

| Receptor Sensitivity | Annual Mean $PM_{10}$ | Number of Receptors | Distance from the Source (m) | | | | |
|---|---|---|---|---|---|---|---|
| | | | <20 | <50 | <100 | <200 | <350 |
| High | >32 µg/m$^3$ | >100 | High | High | High | Medium | Low |
| | | 10-100 | High | High | Medium | Low | Low |
| | | 1-10 | High | Medium | Low | Low | Low |
| | 28-32 µg/m$^3$ | >100 | High | High | Medium | Low | Low |
| | | 10-100 | High | Medium | Low | Low | Low |
| | | 1-10 | High | Medium | Low | Low | Low |
| | 24-28 µg/m$^3$ | >100 | High | Medium | Low | Low | Low |
| | | 10-100 | High | Medium | Low | Low | Low |
| | | 1-10 | Medium | Low | Low | Low | Low |
| | <24 µg/m$^3$ | >100 | Medium | Low | Low | Low | Low |
| | | 10-100 | Low | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| Medium | >32 µg/m$^3$ | >10 | High | Medium | Low | Low | Low |
| | | 1-10 | Medium | Low | Low | Low | Low |
| | 28-32 µg/m$^3$ | >10 | Medium | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| | 24-28 µg/m$^3$ | >10 | Low | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| | <24 µg/m$^3$ | >10 | Low | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| Low | - | >1 | Low | Low | Low | Low | Low |

**Table 9.2.5: Sensitivity of the Area to Ecological Effects [1]**

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

**Table 9.2.6: Defining the Risk of Dust Impacts**

| Sensitivity of the Area | Dust Emission Magnitude | | |
|---|---|---|---|
| | Large | Medium | Small |
| **Demolition** | | | |
| High | High Risk | Medium Risk | Medium Risk |
| Medium | High Risk | Medium Risk | Low Risk |
| Low | Medium Risk | Low Risk | Negligible |
| **Earthworks** | | | |
| High | High Risk | Medium Risk | Low Risk |
| Medium | Medium Risk | Medium Risk | Low Risk |
| Low | Low Risk | Low Risk | Negligible |
| **Construction** | | | |
| High | High Risk | Medium Risk | Low Risk |
| Medium | Medium Risk | Medium Risk | Low Risk |
| Low | Low Risk | Low Risk | Negligible |
| **Trackout** | | | |
| High | High Risk | Medium Risk | Low Risk |
| Medium | Medium Risk | Low Risk | Negligible |
| Low | Low Risk | Low Risk | Negligible |

## 9.3 EPUK & IAQM Planning for Air Quality Guidance

9.3.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

### Air Quality as a Material Consideration

*"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:*

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations".*

### Recommended Best Practice

9.3.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

*"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".*

9.3.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 $m^2$ of commercial floorspace;
- are carried out on land of 1 ha or more.

9.3.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 $m^2$ of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
    - Spark ignition engine: 250 mgNOx/$Nm^3$;
    - Compression ignition engine: 400 mgNOx/$Nm^3$;
    - Gas turbine: 50 mgNOx/$Nm^3$.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/$Nm^3$ and 25 mgPM/$Nm^3$.

9.3.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

*"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".*

9.3.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

## Screening

### *Impacts of the Local Area on the Development*

*"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:*

- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

### *Impacts of the Development on the Local Area*

9.3.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 $m^2$ of floor space for all other uses or a site area greater than 1 ha.

9.3.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

9.3.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

9.3.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

9.3.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

*"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm$^3$.*

*In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.*

*Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".*

9.3.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

*"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".*

9.3.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

*"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".*

9.3.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this chapter.

## Assessment of Significance

9.3.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

9.3.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

9.3.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

9.3.18 A judgement of the significance should be made by a competent professional who is suitably qualified.

# 9.4 Modelling Methodology

## Model Inputs

9.4.1 Predictions have been carried out using the ADMS-Roads dispersion model (v5). The model requires the user to provide various input data, including emissions from each section of road and the road characteristics, including road width. Vehicle emissions have been calculated based on vehicle flow, composition and speed data using the EFT (Version 10.1) published by Defra (2021). Model input parameters are summarised in Table 9.4.1 and, where considered necessary, discussed further below.

**Table 9.4.1: Summary of Model Inputs**

| Model Parameter | Value Used |
|---|---|
| **Terrain Effects Modelled?** | No |
| **Variable Surface Roughness File Used?** | Yes – 12km x 12km Cartesian grid at 50m resolution |
| **Urban Canopy Flow Used?** | No |
| **Advanced Street Canyons Modelled?** | No |
| **Meteorological Monitoring Site** | Brize Norton |
| **Meteorological Data Year** | 2019 |
| **Dispersion Site Surface Roughness Length (m)** | N/A (variable surface roughness file used) |
| **Dispersion Site Minimum MO Length (m)** | 10 |
| **Met Site Surface Roughness Length (m)** | 0.5 |
| **Met Site Minimum MO Length (m)** | 10 |
| **Gradients?** | No |

9.4.2 AADT flows, diurnal flow profiles, speeds, and vehicle fleet composition data have been provided by David Tucker Associates, who have undertaken the transport assessment work for the proposed development. Traffic speeds have been estimated based on professional judgement, taking account of the road layout, speed limits and the proximity to a junction. The traffic data used in this assessment are summarised in Table 9.4.2 and Table 9.4.3. Diurnal and monthly flow profiles for the traffic have been derived from the national profiles published by DfT (2020).

**Table 9.4.2: Summary of Baseline Traffic Data used in the Assessment (AADT Flows) [a]**

| Road Link | 2019 Baseline | | 2025 Baseline | |
|---|---|---|---|---|
| | AADT | %HDV | AADT | %HDV |
| B430 (Ardley) | 8,147 | 4.7 | 15,764 | 4.8 |
| A43 South of Baynards Green | 33,799 | 14.6 | 40,593 | 13.8 |
| A43 North of Baynards Green | 37,011 | 12.0 | 44,601 | 11.4 |
| B4100 West of Baynards Green | 6,900 | 2.6 | 7,475 | 2.6 |
| B4100 East of Baynards Green | 12,349 | 4.0 | 14,338 | 4.1 |
| B4100 North of Bicester | 12,000 | 4.0 | 15,914 | 4.2 |
| A4095 East of B4100 | 17,700 | 4.0 | 20,406 | 4.0 |
| A4095 West of B4100 | 13,772 | 1.6 | 17,180 | 2.0 |

[a] Dual carriageways are modelled as separate roads with traffic data split 50% in each direction.

**Table 9.4.3: Summary of 'With Development' Traffic Data used in the Assessment (AADT Flows) [a]**

| Road Link | 2025 Eastern Parcel | | 2025 Western Parcel | | 2025 Completed Development | |
|---|---|---|---|---|---|---|
| | AADT | %HDV | AADT | %HDV | AADT | %HDV |
| B430 (Ardley) | 15,890 | 4.8 | 15,991 | 4.8 | 16,116 | 4.7 |
| A43 South of Baynards Green | 41,552 | 14.6 | 42,319 | 15.2 | 43,278 | 15.9 |
| A43 North of Baynards Green | 45,078 | 11.8 | 45,460 | 12.1 | 45,938 | 12.5 |
| B4100 West of Baynards Green | 7,634 | 2.6 | 12,005 | 12.7 | 12,164 | 12.5 |
| B4100 West of Western Parcel Access | 7,634 | 2.6 | 7,760 | 2.5 | 7,919 | 2.5 |
| B4100 East of Baynards Green | 15,933 | 8.0 | 16,282 | 4.0 | 17,877 | 7.6 |
| B4100 East of Eastern Parcel Access | 15,418 | 4.0 | 16,282 | 4.0 | 17,363 | 4.0 |
| B4100 North of Bicester | 16,994 | 4.1 | 17,858 | 4.1 | 18,938 | 4.1 |
| A4095 East of B4100 | 20,792 | 4.1 | 21,100 | 4.2 | 21,485 | 4.3 |
| A4095 West of B4100 | 17,527 | 2.0 | 17,805 | 1.9 | 18,152 | 1.9 |
| Eastern Parcel Access | 2,675 | 27.6 | - | - | 2,675 | 27.6 |
| Western Parcel Access | - | - | 4,815 | 27.6 | 4,815 | 27.6 |

[a] Dual carriageways are modelled as separate roads with traffic data split 50% in each direction.

9.4.3 Figure 9.4.1, Figure 9.4.2 and Figure 9.4.3 show the road network included within the model, along with the speed at which each link was modelled.

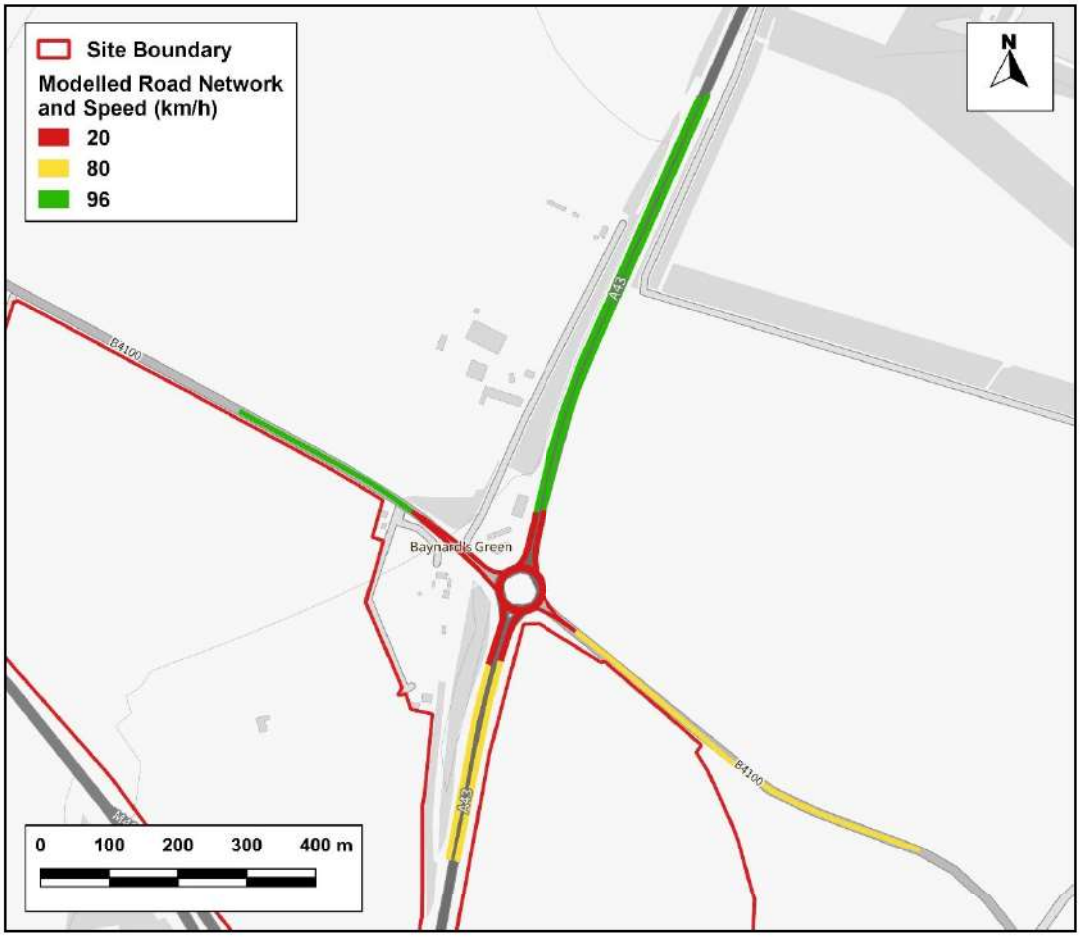


**Figure 9.4.1: Modelled Road Network & Speed (Baynards Green, Baseline Scenario)**

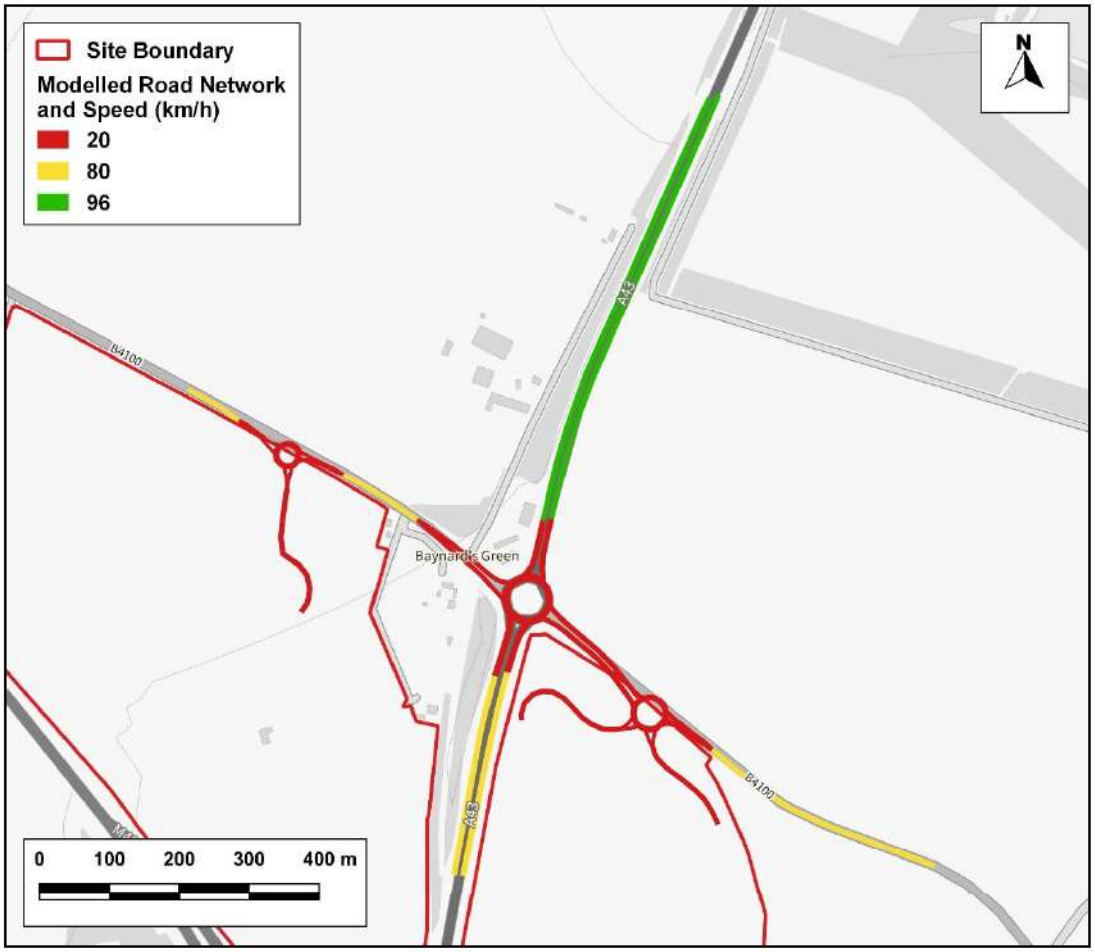


**Figure 9.4.2: Modelled Road Network & Speed (Baynards Green, Development Scenario)**

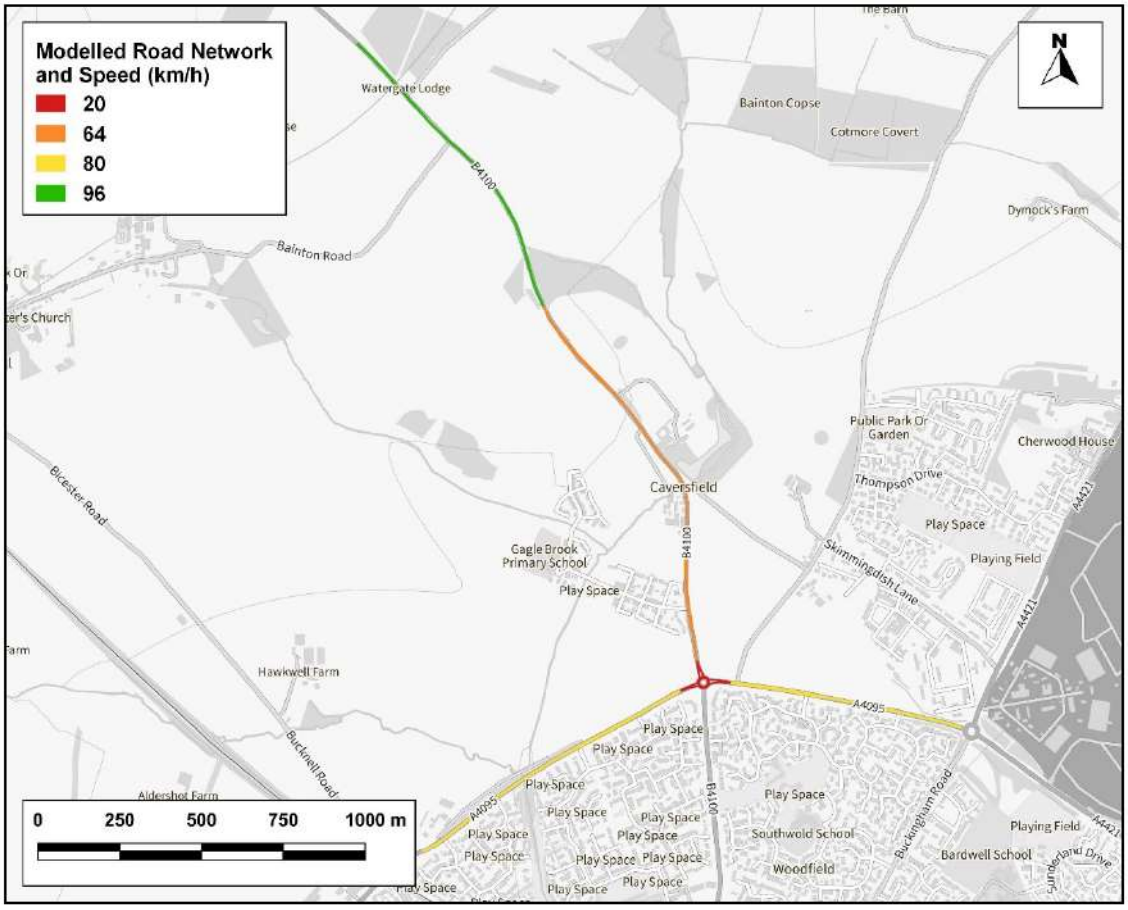


**Figure 9.4.3: Modelled Road Network & Speed (Bicester)**



9.4.4 Hourly sequential meteorological data in sectors of 10 degrees from Brize Norton for 2019 have been used in the model. This meteorological monitoring station is located at RAF Brize Norton, approximately 34 km to the southwest of the proposed development. It is deemed to be the nearest monitoring station with sufficient data representative of meteorological conditions in the vicinity of the proposed development; it is located in an inland area of central England with relatively flat topography. A wind rose for the site for the year 2019 is provided in Figure 9.4.4. The station is operated by the UK Met Office. Raw data were provided by the Met Office and processed by AQC for use in ADMS.

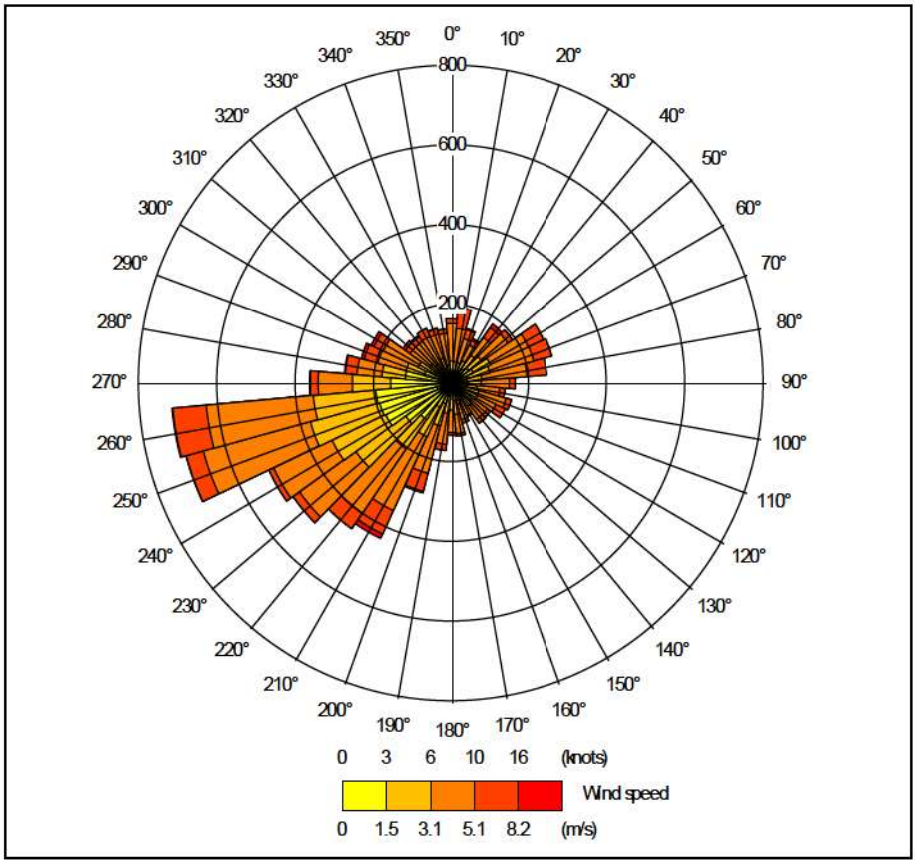


**Figure 9.4.4: Wind Rose**

## Model Verification

9.4.5 Evidence collected over many years has shown that, in most urban areas, dispersion modelling relying upon Defra's EFT has tended to systematically under-predict roadside nitrogen dioxide concentrations. To account for this, it is necessary to adjust the model against local measurements. The model has been run to predict annual mean nitrogen dioxide concentrations during 2019 at the Ardley (B430) and the Howes Lane diffusion tube monitoring sites. These sites have been selected because as they are adjacent to roads which will experience increases in traffic as a result of the Development, and are thus representative. The Tamarisk Gardens site has been excluded from the model verification as it is screened from the roadside by vegetation and buildings.

### *Nitrogen Dioxide*

9.4.6 Most nitrogen dioxide ($NO_2$) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides ($NOx = NO + NO_2$).

9.4.7 The model output of road-NOx (i.e. the component of total NOx coming from road traffic) has been compared with the 'measured' road-NOx. Measured road-NOx has been calculated from the

measured $NO_2$ concentrations and the predicted background $NO_2$ concentration using the NOx from $NO_2$ calculator (Version 8.1) available on the Defra LAQM Support website (Defra, 2021).

9.4.8 The unadjusted model has under predicted the road-NOx contribution; this is a common experience with this and most other road traffic emissions dispersion models. An adjustment factor has been determined as the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution, forced through zero (Figure 9.4.5). The calculated adjustment factor of 3.0982 has been applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations.

9.4.9 The total nitrogen dioxide concentrations have then been determined by combining the adjusted modelled road-NOx concentrations with the predicted background $NO_2$ concentration within the NOx to $NO_2$ calculator. Figure 9.4.6 compares final adjusted modelled total $NO_2$ at each of the monitoring sites to measured total $NO_2$, and shows a close agreement.

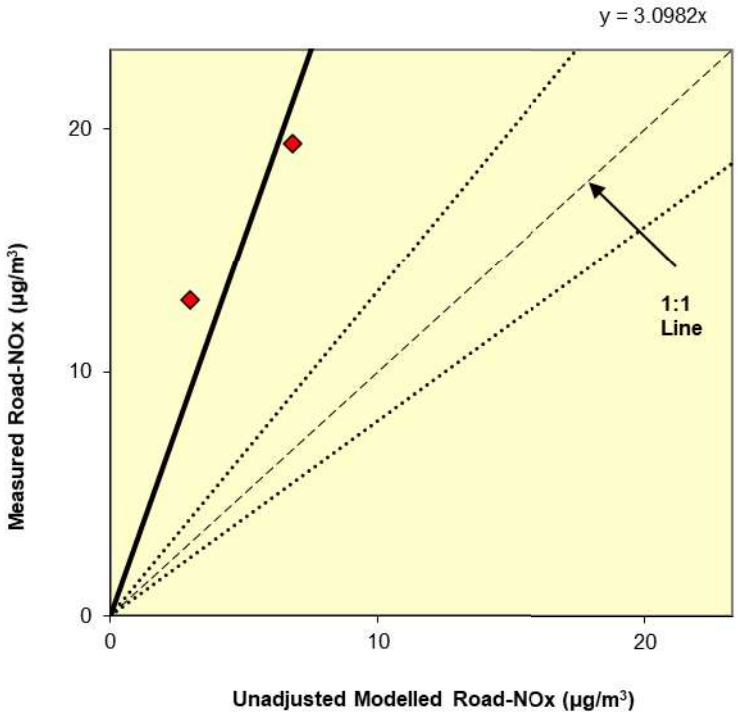


**Figure 9.4.5: Comparison of Measured Road NOx to Unadjusted Modelled Road NOx Concentrations. The dashed lines show ± 25%.**

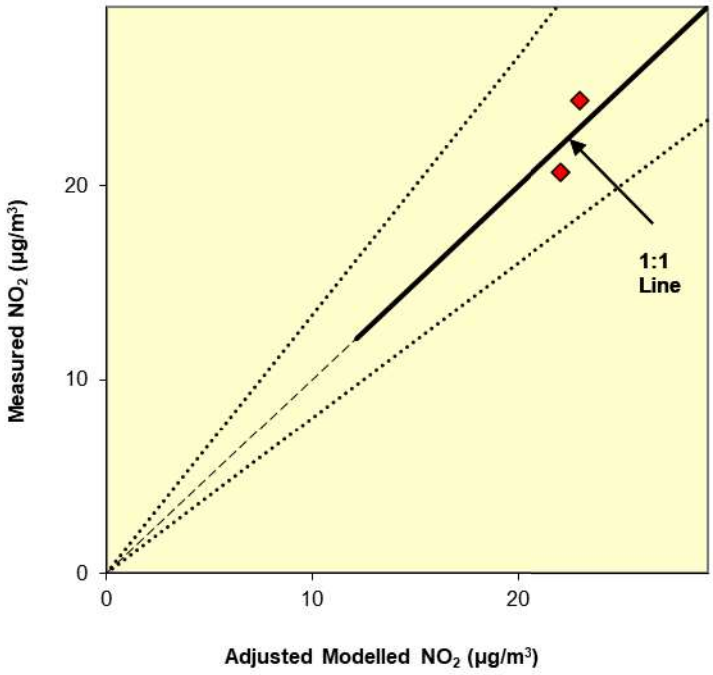


**Figure 9.4.6: Comparison of Measured Total $NO_2$ to Final Adjusted Modelled Total $NO_2$ Concentrations. The dashed lines show ± 25%.**

### *$PM_{10}$ and $PM_{2.5}$*

9.4.10 The approach described above for NOx and nitrogen dioxide determines the road increment of concentrations by subtracting the predicted local background from the roadside measurements. This works well for NOx because the differences between roadside and background concentrations typically represent a large proportion of the total measured value. The same is not true for $PM_{10}$ and $PM_{2.5}$ concentrations, which are dominated by non-road emissions, even at the roadside. In practice, the influence of a local road on concentrations can often be smaller than the uncertainty in the mapped background concentration. As an example of this, 31% of all roadside and kerbside sites in London which measured $PM_{2.5}$ in 2019 with >75% data capture, recorded an annual mean concentration lower than the equivalent Defra mapped background value. Using measured background concentrations does not provide any significant benefit, owing largely to the spatial resolution of available measurements, but also because of measurement uncertainty. For example, hourly-mean $PM_{2.5}$ concentrations measured at roadside sites are often lower than those measured at nearby urban background sites, while concentrations at urban background sites are often lower than those measured at rural sites.

9.4.11 For these reasons, it is not appropriate to calculate the annual mean road-increment to $PM_{10}$ and $PM_{2.5}$ concentrations by subtracting either the mapped background or a local measured background concentration. This, in turn, means that the approach to model adjustment which is described for

NOx and $NO_2$ is not appropriate for $PM_{10}$ and $PM_{2.5}$. Historically, many studies have derived a model adjustment factor for NOx and applied this to $PM_{10}$ and $PM_{2.5}$. This is also not appropriate, since there is no reason to expect the same bias in emissions of NOx, $PM_{10}$ and $PM_{2.5}$.

9.4.12 While there is very strong evidence that EFT-based models have consistently under-predicted road-NOx concentrations in urban areas, there is no equivalent evidence for $PM_{10}$ and $PM_{2.5}$. There is currently no strong basis for applying any adjustment to the model outputs. Predicted concentrations of $PM_{10}$ and $PM_{2.5}$ have thus not been adjusted.

## Post-Processing

9.4.13 The model predicts road-NOx concentrations at each receptor location. These concentrations have been adjusted using the adjustment factor set out above, which, along with the background $NO_2$, has been processed through the NOx to $NO_2$ calculator available on the Defra LAQM Support website (Defra, 2021). The traffic mix within the calculator has been set to "All other urban UK traffic", which is considered suitable for the study area. The calculator predicts the component of $NO_2$ based on the adjusted road-NOx and the background $NO_2$.

## Model Uncertainty

9.4.14 There are a number of components that contribute to the uncertainty of modelling predictions. The road traffic emissions dispersion model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them and limitations in their scope of prediction.

9.4.15 There are additional uncertainties associated with the model itself, which simplifies real-world conditions into a series of algorithms. An important stage in the process is model verification, and as the model has been verified and adjusted, there can be reasonable confidence in the prediction of base year (2019) concentrations.

9.4.16 However, predicting pollutant concentrations in a future year will always be subject to greater uncertainty. As the model cannot be verified in the future, and it is necessary to rely on a series of projections as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions. Historic versions of Defra's EFT tended to over-state emissions reductions into the future. However, analyses of the most recent versions of Defra's EFT carried out by AQC (2020a) (2020b), suggest that, on balance, these versions are unlikely to over-state the rate at which NOx emissions decline in the future at an 'average' site in the UK. In practice, the balance of evidence suggests that NOx concentrations are most likely to decline more quickly in the future, on average, than predicted by the current EFT, especially against a base year of 2016 or later. Using EFT v10.1 for future-year forecasts in this report thus provides a robust assessment, given that the model has been verified against measurements made in 2019.

9.4.17 Forecasts of future-year concentrations are usually based on measurements made during a recent year. They then take account of projected changes over time to factors such as the composition of the vehicle fleet and the uptake of other new technologies, as well as population increases etc. In early 2020, activity in the UK was disrupted by the Covid-19 pandemic. As a result, concentrations of traffic-related air pollutants fell appreciably (Defra Air Quality Expert Group, 2020). While the pandemic may cause long-lasting changes to travel activity patterns, it is reasonable to expect a return to more typical activity levels in the future. 2020 is thus likely to present as an atypically low pollution year for roadside pollutant concentrations, as is 2021.

9.4.18 It is not currently possible to make robust predictions of the rate at which travel activity patterns will return to historically normal levels; or the extent of any long-lasting changes to travel behaviour. The most robust approach to making future-year projections is thus to base these on measurements made during 2019, and to use activity forecasts made before the impact of the pandemic was understood, which is the approach that has been taken in this assessment.

## 9.5 Construction Mitigation

9.5.1 Table 9.5.1 sets out a list of best-practice measures from the IAQM guidance (IAQM, 2016) that should be incorporated into the specification for the works. These measures should ideally be written into a Dust Management Plan. Some of the measures may only be necessary during specific phases of work, or during activities with a high potential to produce dust, and the list should be refined and expanded upon in liaison with the construction contractor when producing the Dust Management Plan.

**Table 9.5.1: Best-Practice Mitigation Measures Recommended for the Works**

| Measure | Desirable | Highly Recommended |
|---|---|---|
| **Communications** | | |
| Develop and implement a stakeholder communications plan that includes community engagement before and during work on site | | ✓ |
| Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environmental manager/engineer or the site manager | | ✓ |
| Display the head or regional office contact information | | ✓ |
| **Dust Management Plan** | | |
| Develop and implement a Dust Management Plan (DMP) approved by the Local Authority which documents the mitigation measures to be applied, and the procedures for their implementation and management | | ✓ |
| **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 | | ✓ |
| Make the complaints log available to the local authority when asked | | ✓ |
| Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book | | ✓ |
| **Monitoring** | | |
| Undertake daily on-site and off-site inspections 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 100 m of the site boundary, with cleaning to be provided if necessary | ✓ | |
| 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 | | ✓ |
| Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions | | ✓ |

| | | |
|---|---|---|
| Agree dust deposition, dust flux, or real-time $PM_{10}$ continuous monitoring locations with the Local Authority. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction **(IAQM, 2018)** | | ✓ |
| **Preparing and Maintaining the Site** | | |
| Plan the site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible | | ✓ |
| Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site | | ✓ |
| Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period | | ✓ |
| Avoid site runoff of water or mud | | ✓ |
| Keep site fencing, barriers and scaffolding clean using wet methods | | ✓ |
| 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 | | ✓ |
| Cover, seed, or fence stockpiles to prevent wind whipping | | ✓ |
| **Operating Vehicle/Machinery and Sustainable Travel** | | |
| Ensure all vehicles switch off their engines when stationary – no idling vehicles | | ✓ |
| Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable | | ✓ |
| Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced 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) | ✓ | |
| Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials | | ✓ |
| Implement a Travel Plan that supports and encourages sustainable staff 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 | | ✓ |
| Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate | | ✓ |
| Use enclosed chutes, conveyors and covered skips | | ✓ |
| Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate | | ✓ |
| 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 | | ✓ |
| **Measures Specific to Earthworks** | | |
| Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable | ✓ | |
| Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable | ✓ | |
| Only remove the cover from small areas during work, not all at once | ✓ | |
| **Measures Specific to Construction** | | |
| Avoid scabbling (roughening of concrete surfaces), if possible | ✓ | |
| 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 | | ✓ |
| 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 | ✓ | |
| For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust | ✓ | |
| **Measures Specific to 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 | | ✓ |
| Avoid dry sweeping of large areas | | ✓ |
| Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport | | ✓ |
| Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable | | ✓ |
| Record all inspections of haul routes and any subsequent action in a site log book | | ✓ |
| Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems or mobile water bowsers, and regularly cleaned | | ✓ |
| Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable) | | ✓ |
| Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits | | ✓ |
| Access gates should be located at least 10 m from receptors, where possible | | ✓ |

# 9.6 Glossary and References

## Glossary

| | |
|---|---|
| **AADT** | Annual Average Daily Traffic |
| **ADMS-Roads** | Atmospheric Dispersion Modelling System model for Roads |
| **APIS** | Air Pollution Information System |
| **AQAL** | Air Quality Assessment Level |
| **AQC** | Air Quality Consultants |
| **AQMA** | Air Quality Management Area |
| **AURN** | Automatic Urban and Rural Network |
| **CAZ** | Clean Air Zone |
| **CDC** | Cherwell District Council |
| **CEMP** | Construction Environmental Management Plan |
| **Defra** | Department for Environment, Food and Rural Affairs |
| **DfT** | Department for Transport |
| **DMP** | Dust Management Plan |
| **EFT** | Emission Factor Toolkit |
| **EPUK** | Environmental Protection UK |
| **EU** | European Union |
| **EV** | Electric Vehicle |
| **Exceedance** | A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure |
| **HDV** | Heavy Duty Vehicles (> 3.5 tonnes) |
| **HGV** | Heavy Goods Vehicle |
| **HMSO** | Her Majesty's Stationery Office |
| **IAQM** | Institute of Air Quality Management |
| **JAQU** | Joint Air Quality Unit |
| **km/h** | Kilometres Per hour |
| **LAQM** | Local Air Quality Management |

| | |
|---|---|
| **LDV** | Light Duty Vehicles (<3.5 tonnes) |
| **LGV** | Light Goods Vehicle |
| **µg/m$^3$** | Micrograms per cubic metre |
| **NO** | Nitric oxide |
| **$NO_2$** | Nitrogen dioxide |
| **NOx** | Nitrogen oxides (taken to be $NO_2$ + NO) |
| **NPPF** | National Planning Policy Framework |
| **NRMM** | Non-road Mobile Machinery |
| **Objectives** | A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides |
| **OLEV** | Office for Low Emission Vehicles |
| **$PM_{10}$** | Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter |
| **$PM_{2.5}$** | Small airborne particles less than 2.5 micrometres in aerodynamic diameter |
| **PPG** | Planning Practice Guidance |
| **RDE** | Real Driving Emissions |
| **SPD** | Supplementary Planning Document |
| **SSSI** | Site of Special Scientific Interest |
| **Standards** | A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal |
| **TEMPro** | Trip End Model Presentation Program |

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# Appendix 10.1

## TECHNICAL GLOSSARY

# Appendix 10.1: Technical Glossary

Table 10.1: Technical acoustic terms and definitions

| Technical Term | Definition |
|---|---|
| A-weighting | The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A). |
| Ambient noise | Usually expressed using $L_{Aeq,T}$ unit, commonly understood to include all sound sources present at any particular site, regardless of whether they are actually defined as noise. |
| Background noise | The steady noise attributable to less prominent and mostly distant sound sources above which identifiable specific noise sources intrude. |
| The decibel (dB) | The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic, and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2x10-5 Pa) and the threshold of pain is around 120 dB.<br>The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in Watts. The sound power level, Lw, is expressed in decibels, referenced to 1012 W. |
| Frequency (Hz) | Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules that transmit the sound and is measured as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands). |
| $L_{A10,18h}$ | $L_{A10,18h}$ is the noise level exceeded for 10% of an 18-hour period (06:00 to 00:00) and is normally used in the UK to assess road traffic noise. |
| $L_{A90}$ | $L_{A90}$ is the noise level exceeded for 90% of the time and is normally used to describe background noise. |
| $L_{Aeq,T}$ | The most widely applicable unit is the equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$). It is an energy average and is defined as the |