10.0 AIR QUALITY EFFECTS

CONTENTS

APPENDICES

FIGURES

TABLES

10.1 INTRODUCTION

10.1.1 This chapter reports on the effects of the Development on local air quality and has been completed by Entran Ltd.

10.1.2 The potential effects of the Proposed Development on local air quality during both the construction and operational phases have been assessed. For both phases, the type, source and significance of potential effects are identified and the measures that should be employed to minimise these effects are described. The suitability of the Site for residential use has also been appraised with regards to exposure of future occupants to elevated pollution concentrations.

10.1.3 A glossary of common air quality terminology is provided in **Appendix 10.01.**

10.2 METHODOLOGY

Scope of Assessment

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

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

10.2.2 The development proposals will provide up to 850 dwellings with associated

infrastructure and landscaping; therefore, there is the potential for impacts on local air quality during both the construction and operational phases of the Proposed Development. The Banbury AQMA is located approximately 2.6km to the north of the Site. There is therefore a risk that traffic generated by the operational development will impact air quality within the AQMA.

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

Construction Phase Methodology

Construction Traffic

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

10.2.5 No information has been provided on the number of vehicles that will be generated

during the construction period, however, based on the size of the development proposals it is anticipated that there will be in excess of 50 additional Heavy-Duty Vehicles (HDV) generated on the adjacent road network per day.

10.2.6 The Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) air quality guidance (Ref. 10.1) sets out criteria to assist in establishing when

an air quality assessment will be required. These criteria indicate that significant impacts on air quality are unlikely to occur where a development results in less than 25 additional vehicles per day in locations within an Air Quality Management Area (AQMA) and less than 100 outside of an AQMA. The Site is not located within or close to an AQMA, however the most direct route to the Site for traffic approaching from the M40 motorway is through an AQMA. Therefore, it is considered that construction traffic generated by the Proposed Development may impact the local NO_2, PM_{10} and $PM_{2.5}$ concentrations within the AQMA.

10.2.7 A qualitative assessment of the impact of emissions from construction traffic on local air quality has been undertaken using professional judgement and by considering the number and type of construction traffic and plant likely to be generated, the number and proximity of sensitive receptors to the Site and along the likely routes to be used by construction vehicles and the likely duration of the construction phase.

Construction Dust

10.2.8 To assess the potential impacts associated with dust and particulate matter releases during the construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the IAQM (Ref. 10.2) has been undertaken.

10.2.9 This approach divides construction activities into the following four categories:

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

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

- annoyance due to dust soiling;
- harm to ecological receptors; and
- the risk of health effects due to a significant increase in exposure to PM_{10}.

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

10.2.12 The IAQM guidance sets out the assessment in a number of steps. The first is an initial screening assessment to determine if there are any sensitive receptors (both human and ecological) within 350 m of the site boundary or within 100m of the proposed construction haulage routes, thus determining the requirement for a more detailed evaluation.

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

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

10.2.14 Risks are described in terms of there being a low, medium or high risk of dust effects for each of the four separate potential activities. This assessment is based on both IAQM criteria and professional judgement.

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

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

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

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

Operational Phase Methodology

10.2.19 The prediction of air quality at the Site and surrounding area has been undertaken using the ADMS Roads dispersion model. This is a commercially available dispersion model and has been widely validated for this type of assessment and used extensively in the Air Quality Review and Assessment process.

10.2.20 The model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollution concentrations at specific locations

selected by the user. Meteorological data from the Church Lawford Meteorological Station from 2016 has been used for the assessment.

10.2.21 The model uses traffic flow data and vehicle related emission factors to predict road specific concentrations of oxides of nitrogen (NOx), PM_{10} and $PM_{2.5}$ at sensitive receptors selected by the user. The predicted concentrations of NO_X have been converted to NO_2 using the Local Air Quality Management (LAQM) calculator on the Defra air quality website (Ref. 10.3).

10.2.22 Traffic data for the road network in the vicinity of the Site have been provided by the transport consultants, Markides Associates Ltd, for the 2016 base year and the anticipated completion year of 2031 with and without development scenarios.

10.2.23 A summary of the traffic data used in the assessment can be found in **Appendix 10.01**. The data includes details of annual average daily traffic flows (AADT), vehicle speeds and percentage heavy duty vehicles (HDV).

10.2.24 To predict local air quality, traffic emissions predicted by the model must be added to local background concentrations. Background concentrations of NO_X, NO_2, PM_{10} and $PM_{2.5}$ have been taken from the 2015 Defra background maps. 2016 background concentrations have been used for the future year scenarios in 2031 to ensure a worst-case prediction of future air quality. The background concentrations used in the assessment are provided in Table 10.04.

10.2.25 The emission factors released by Defra in December 2017, provided in the emissions factor toolkit EFT2017_8.0.1 and have been used within the ADMS model (Version 4.1.1.0) to predict traffic emissions in 2016 and 2031.

10.2.26 It is recommended, following guidance set out in LAQM.TG(16) (Ref. 10.4), that the model results are compared with measured data to determine whether the model results need adjusting to more accurately reflect local air quality. This process is known as verification.

10.2.27 LAQM.TG(16) recommends that model predictions should be within 25% (preferably 10%) of monitored concentrations for the model to be predicting with any degree of accuracy. The model has been used to predict NO_2 concentrations at a number of monitoring locations in the vicinity of the Site to verify the model results. This includes monitoring sites located within the AQMA.

10.2.28 The results of the comparison are presented below in Table 10.01.

Table 10.01: Comparison of Modelled and Monitored NO_2 Concentrations ($\mu g/m^3$)

Monitoring Locations	**Measured Concentrations (NO_2)**	**Modelled Concentrations (NO_2)**	**% Difference**
Bridge Street	33.0	40.3	22%
Bankside	17.9	22.3	25%
High Street	34.6	41.5	20%
Oxford Road/South	35.5	40.9	15%
Horsefair	38.8	40.9	5%
Oxford Road 2014	22.1	24.7	12%
Cherwell Street 2014	37.7	39.8	6%

10.2.29 The comparison of monitored and modelled concentrations indicates that the model is under-predicting annual mean NO_2 concentrations by up to 25%. The results of the modelling assessment have been adjusted using the methodology given in LAQM.TG(16). Full details of the verification and calculation of adjustment factors are provided in **Appendix 10.01**.

10.2.30 There is no suitable monitoring data for PM_{10} or $PM_{2.5}$ to allow verification of the PM model results. However, LAQM.TG(16) suggests applying the NO_X adjustment factor to modelled road-PM where no appropriate verification against PM data can be carried out. The adjustment factors calculated for the NO_X data have therefore been used to adjust the predicted PM_{10} and $PM_{2.5}$ data.

10.2.31 LAQM.TG(16) does not provide a method for the conversion of annual mean NO_2 concentrations to 1-hour mean NO_2 concentrations. However, research (Ref. 10.5) has concluded that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 $\mu g/m^3$. Care has been taken to ensure that locations where the 1-hour mean objective is relevant are included in the assessment.

10.2.32 Quantitative assessment of the impacts on local air quality from road traffic emissions associated with the operation of the development have been completed against the Air Quality Strategy objectives set out in **Appendix 10.01** for NO_2, PM_{10} and $PM_{2.5}$.

Significance Criteria

10.2.33 The guidance issued by EPUK & IAQM (Ref. 10.2) relates to Air Quality considerations within the planning process and sets criterion which identify the need for an Air Quality Assessment, the type of Air Quality assessment required, and the significance of any predicted impact.

10.2.34 The guidance recommends that the impact at individual receptors is described by expressing the magnitude of incremental change in pollutant concentrations as a proportion of an Air Quality Assessment Level (AQAL) such as the air quality

objectives set out in **Appendix 10.04**. The significance of impact is then identified based on the incremental change in the context of the new total concentrations and its relationship with the assessment criteria, noting whether the impact is adverse or beneficial based on a positive or negative change in concentrations. The criteria suggested for assigning significance is set out in Table 10.02 below.

Table 10.02: Impact Descriptors for Individual Receptors

Long-term average concentration at receptor in assessment year	% Change in Concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Minor	Moderate
76-94% of AQAL	Negligible	Minor	Moderate	Moderate
95-102% of AQAL	Minor	Moderate	Moderate	Major
103-109% of AQAL	Moderate	Moderate	Major	Major
110% or more of AQAL	Moderate	Major	Major	Major

AQAL – Air Quality Assessment Level which in this assessment refers to the Air Quality Objectives set out in **Appendix 10.01**.

The percentage change in concentration should be rounded to a whole number The table should only be used with annual mean concentrations

The descriptors are for individual receptors only: overall significance should be based on professional judgment

When defining the concentrations as a percentage of the AQAL use the 'without scheme' concentration where there is a decrease in pollutant concentrations and the 'with scheme' concentrations for an increase

The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value i.e. well below, the degree of harm is likely to be small. As exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL
It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year, it is impossible to define the new total concentrations without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

10.2.35 The EPUK & IAQM guidance notes that the criteria in Table 10.02 should be used to describe impacts at individual receptors and should be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The EPUK & IAQM guidance states that the assessment of overall significance should be based on professional judgement, taking into account several factors, including:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Sensitive Receptors

10.2.36 LAQM.TG(16) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations 'where members of the public are regularly present' should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for

assessment purposes.

10.2.37 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standards (i.e. 15 minute mean or 1 hour mean) may be relevant. In a school, or adjacent to a private dwelling, however; where exposure may be for longer periods, comparison with long-term standards (such as 24 hour mean or annual mean) may be most appropriate. In general terms, concentrations associated with long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

10.2.38 For the completion of this assessment, consideration of the potential impacts of the Proposed Development on local air quality has been undertaken by predicting pollutant concentrations at receptors adjacent to the surrounding road network both within and outside the AQMA. In addition, four receptors within the Bankside Phase I development were included, it is understood that these properties are currently under construction. The modelling assessment also predicted concentrations at six locations within the Proposed Development itself.

10.2.39 Details of the receptors are provided below in Table 10.03 and their locations presented in Figure 10.01. Receptors 28 to 33 are located within the boundary of the Proposed Development.

Table 10.03: Location of Receptors used in Modelling Assessment

Receptor Number	Receptor Name/Location	Type	In AQMA	OS Grid Reference
1	4 South Bar Street	Residential (above shop)	Y	445328, 240318
2	21 South Bar Street	Residential (above shop)	Y	445342, 240225
3	Bus Stop South Bar Street	Bus Stop	Y	445331, 240140
4	6 Hightown Road	Residential	N	446052, 239984
5	49 Queensway	Residential	N	444561, 239896
6	125 Bloxham Road	Residential	N	444967, 239529
7	45 Horton View	Residential	N	445352, 239502
8	Bus Stop on Oxford Road	Residential	N	445469, 239641
9	24 Farmfield Road	Residential	N	445451, 239289
10	Horton General Hospital	Hospital	N	445526, 239612
11	92 Oxford Road	Residential	N	445474, 239586
12	132 Oxford Road	Residential	N	445576, 239348
13	Bus Stop on corner of Oxford Road/Grange	Bus Stop	N	445672, 239254
14	The Grange County Primary School	School	N	445892, 239169

15	The Grange County Primary School Playing	School	N	445850, 239155
16	59 St Annes Road	Residential	N	445769, 239161
17	164 Oxford Road	Residential	N	445895, 238981
18	27 Arbury Close	Residential	N	446378, 238742
19	2 Farm Way	Residential	N	446564, 239245
20	100 Oxford Road	Residential	N	446637, 237853
21	Oxford Road opposite health club	Residential	N	446758, 237627
22	Cotefield House	Residential	N	446900, 237430
23	31 Twyford Road	Residential	N	447383, 236733
24	9 Twyford Gardens	Residential	N	447326, 236419
25	Adderbury Bowls Club	Leisure	N	447271, 236554
26	Christopher Rawlins Primary School	School	N	447426, 235872
27	Christopher Rawlins Primary School Grounds	School	N	447414, 235861
28	Within Proposed Development	Proposed Residential	N	446753, 237815
29	Within Proposed Development	Proposed Residential	N	446831, 238006

30	Within Proposed Development	Proposed Residential	N	447160, 238180
31	Within Proposed Development	Proposed Residential	N	447526, 237950
32	Within Proposed Development	Proposed Residential	N	447212, 237578
33	Within Proposed Development	Proposed School	N	447152, 237375

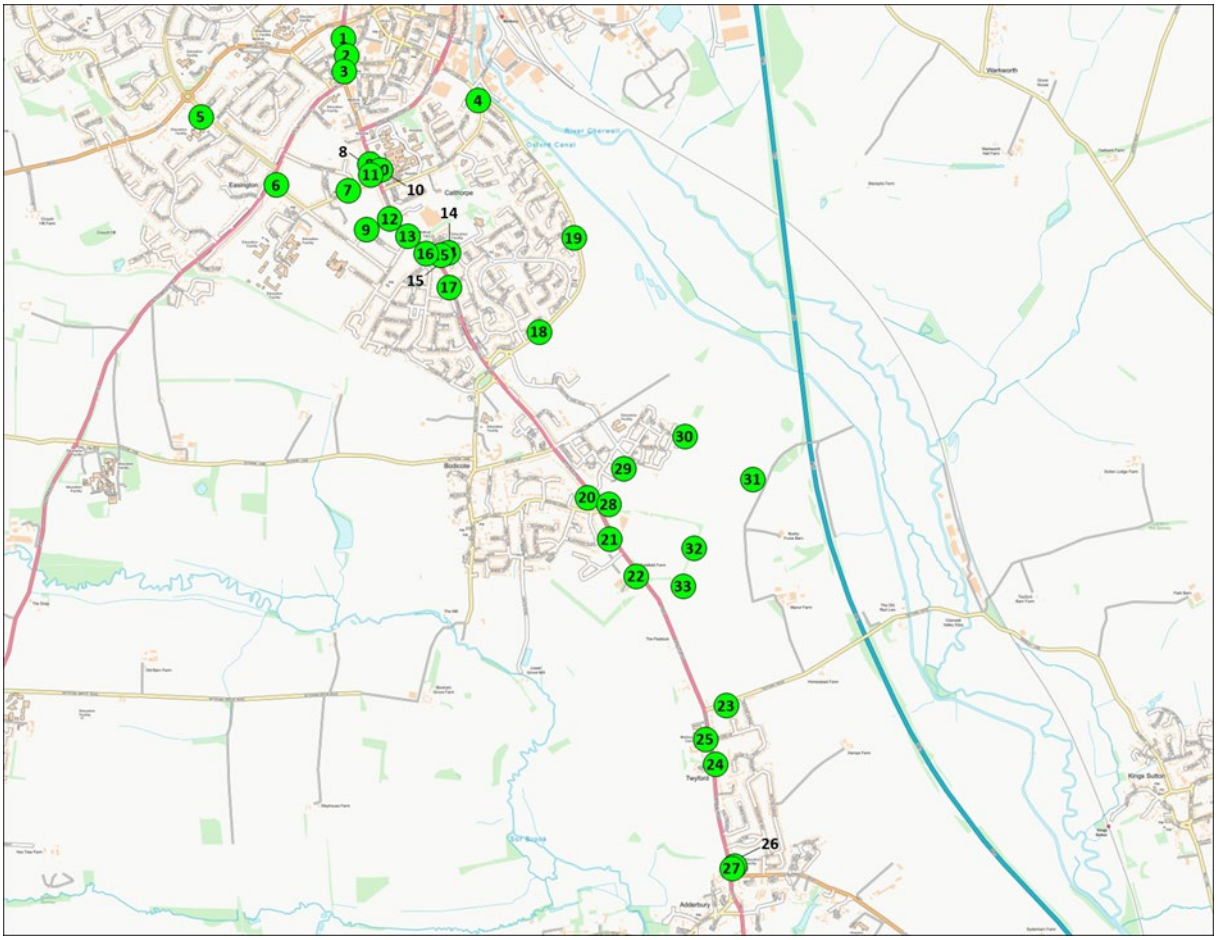

Figure 10.01: Location of Receptors used in Modelling Assessment

Legislation, Policy and Guidance

The European Directive on Ambient Air and Cleaner Air for Europe

10.2.40 European Directive 2008/50/EC (Ref. 10.6) of the European Parliament and of the Council of 21st May 2008, sets legally-binding Europe-wide limit values for the protection of public health and sensitive habitats. The Directive streamlines the European Union's air quality legislation by replacing four of the five existing Air Quality Directives within a single, integrated instrument.

10.2.41 The pollutants included are sulphur dioxide (SO_2), NO_2, PM_{10}, $PM_{2.5}$, lead (Pb), carbon monoxide (CO), benzene (C_6H_6), ozone (O_3), polycyclic aromatic hydrocarbons (PAHs), cadmium (Cd), arsenic (As), nickel (Ni) and mercury (Hg).

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

10.2.42 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007 (Ref. 10.7), pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

10.2.43 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are C_6H_6, 1,3-butadiene (C_4H_6), CO, Pb, NO_2, PM_{10}, $PM_{2.5}$, SO_2, O_3 and PAHs.

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

10.2.45 The air quality objectives are medium-term policy based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO

guideline limits, whereas others involve a margin of tolerance,

i.e. a limited number of permitted exceedances of the standard over a given period.

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

10.2.47 The AQS also contains a framework for considering the effects of a finer group of particles known as '$PM_{2.5}$' Local Authorities are required to work towards reducing emissions / concentrations of $PM_{2.5}$, but there is currently no statutory objective incorporated into UK law at this time.

10.2.48 The AQS objective levels relevant to this assessment are presented in **Appendix 10.04**.

Air Quality (England) Regulations

10.2.49 Many of the objectives in the AQS were made statutory in England through the Air Quality (England) Regulations 2000 (Ref 10.8) and the Air Quality (England) (Amendment) Regulations 2002 (the Regulations) (Ref 10.9) for the purpose of Local Air Quality Management (LAQM).

10.2.50 The Air Quality Standards Regulations 2010 (Ref 10.10) came into force on the 10th June 2010 and have adopted into UK law the limit values required by EU Directive 2008/50/EC. These regulations prescribe the 'relevant period' (referred to in Part I2V of the

Environment Act 1995) that local authorities must consider in their review of the future quality of air within their area. The regulations also set out the air quality objectives to be achieved by the end of the 'relevant period'.

10.2.51 Ozone is not included in the Regulations as, due to its transboundary nature, mitigation measures must be implemented at a national level rather than at a local authority level.

Local Air Quality Management (LAQM)

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

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

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

10.2.55 The Department of Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their Review and Assessment work (Ref. 10.4) This guidance, referred to in this chapter as LAQM.TG(16), has been used where appropriate in the assessment.

National Planning Policy Framework

10.2.56 Published on 27th March 2012, the National Planning Policy Framework (NPPF) (Ref. 10.11) sets out the Government's planning policies for England and how these are expected to be applied. It replaces Planning Policy Statement 23: Planning and Pollution Control (Ref. 10.12), which provided planning guidance for local authorities with regards to air quality.

10.2.57 At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the Framework with the objective of contributing to the achievement of sustainable development.

10.2.58 The revised NPPF (Ref 10.13) was published in February 2019 and states that 'planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas'. It outlines the principles upon which the planning process can take account of air quality impacts associated with new developments. It outlines the role of Local Plans in promoting sustainability and providing limitations on development in areas of poor air quality. An emphasis is placed on consultation with the planning authority to determine whether there are any local issues with the potential to affect the scope of an air quality assessment. Typical air quality mitigation measures are outlined highlighting the use of planning conditions and funding obligations to off-set any significant impacts.

Control of Dust and particulates Associated with Construction

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

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

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

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

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

Cherwell Local Plan 2011 to 2031 (adopted July 2015)

10.2.63 The local plan sets out the long term spatial vision for the District and provides policies to assist in delivering the vision. The local plan contains no policies specific to air quality.

EPUK & IAQM Land Use Planning and Development Control

10.2.64 Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) published the Land Use Planning and Development Control Air Quality guidance in May 2015 (Ref. 10.2) to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

10.2.65 The main focus of the guidance is to ensure all developments apply good practice principles to ensure emissions and exposure are kept to a minimum. It also sets out criteria for identifying when a more detailed assessment of operational impacts is required, guidance on undertaking detailed assessments and criteria for assigning the significance of any identified impacts.

10.2.66 This guidance has been used within this assessment.

Assessment of Dust from Demolition and Construction

10.2.67 The IAQM published guidance in 2014 on the assessment of emissions from demolition and construction activities (Ref. 10.1). The guidance sets out an approach to identifying the risk of impacts occurring at nearby sensitive receptors from dust generated during the construction process and sets out recommended mitigation measures based on the identified risk.

10.2.68 This guidance has been used within this assessment.

10.3 BASELINE CONDITIONS

Cherwell District Council Review and Assessment of Air Quality

10.3.1 Cherwell District Council (CDC) has carried out detailed assessments of air quality throughout the regulatory area. The review and assessment process has identified exceedances of the annual mean NO_2 objective at a number of locations within the district including along the main road (A361) within Banbury. An AQMA has been declared incorporating the properties located along the section of the A361 between Bloxham Road and Castle Street. It lies approximately 2.6 km to the north of the development site.

Automatic Local Monitoring

10.3.2 CDC does not operate any automatic monitoring sites.

Non-automatic Local Monitoring

10.3.3 CDC currently operates 45 diffusion tube sites within the regulatory area monitoring concentrations of NO_2. Details of the sites that are considered relevant to the assessment are set out in Table 10.04 below. With the exception of Horsefair, the data indicates that annual mean concentrations in Banbury are generally within the air quality objective of 40 $\mu g/m^3$.

10.3.4 Whilst NO_2 concentrations within the AQMA have mostly declined over the five year period, there is no long-term trend in the data that would suggest that there has been a significant decline in concentrations at locations outside the AQMA.

Table 10.04: NO_2 Diffusion Tube Monitoring (bias corrected, $\mu g/m^3$)

Location	Site Type	OS grid Ref	In AQMA	Annual Mean NO_2 Concentrations ($\mu g/m^3$)				
				2013	2014	2015	2016	2017
Bridge Street	Kerbside	445961, 240595	N	34.1	32.8	33.6	33.0	33.1
Oxford Road 2014	Roadside	446774, 237620	N	-	20.9	19.4	22.1	20.3
Bankside	Roadside	446377, 239620	N	19.9	18.4	16.3	17.9	17.0
Oxford Rd / South Bar	Kerbside	445335, 240094	Y	39.9	37.6	33.2	35.5	33.4
High Street	Kerbside	445407, 240421	Y	38.3	38.3	35.3	34.6	35.0
Horsefair (triplicate)	Roadside	445351, 240578	Y	42.2	42.4	40.9	38.8	41.8
North Bar	Kerbside	445352, 240744	Y	39.6	39.6	38.9	36.5	36.9
Cherwell Street 2014	Roadside	445932, 240499	N	-	29.3	35.3	37.7	37.3
Cranleigh Close	Urban Background	444367, 239654	No	13.5	11.8	10.9	12.5	10.7
Sinclair Avenue	Urban Background	444274,241289	No	17.4	14.7	14.5	16.8	14.4
The Green, Adderbury	Kerbside	447403, 235723	No	31.9	30.4	28	28.3	26.8

Defra Background Maps

10.3.5 In the absence of local monitoring data for PM_{10} and $PM_{2.5}$ and for comparison with the

measured background NO_2 data, concentrations have been obtained from the Defra background pollutant maps. These 1 km grid resolution maps are derived from a complex modelling exercise that takes into account emissions inventories and measurements of ambient air pollution from both automated and non-automated sites. The latest background maps were issued in November 2017 and are based on 2015 monitoring data.

10.3.6 The maximum 2016 annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations at the Proposed Development site and the selected sensitive receptor locations have been determined from contour plots of the mapped data and are presented in Table 10.05. The mapped concentrations for all three pollutants are well within the relevant long-term air quality standards and the NO_2 concentrations are in good agreement with those measured at the urban background monitoring sites in Banbury.

10.3.7 The background concentration assumed for the assessment is the maximum mapped concentration over the study area, which represents a worst-case at the majority of the receptor locations. Furthermore, the 2016 data are assumed to be representative of existing and future (2031) background concentrations in the area, which is a highly conservative assumption.

Table 10.05: Estimated Annual Mean Background Concentrations from Defra Maps ($\mu g/m^3$)

Pollutant	Range over Study Area	Assessment value	AQAL
NO_2	9.0 – 14.0	14.0	40
PM_{10}	12.5 – 15.5	15.5	40
$PM_{2.5}$	8.6 – 11.3	11.3	25

10.4 IMPACTS

Construction Dust Impacts

Site and Surroundings

10.4.1 The Site is currently a large agricultural field. There are no buildings on the Site that would require demolition therefore impacts associated with demolition activities have not been considered within this report.

10.4.2 Based on the IAQM guidance sensitive receptors that may be affected by dust emissions during construction activities include residential properties, educational facilities, retail premises, places of work, recreational areas and ecological receptors. The nearest residential receptors are to the west on Oxford Road. To the north of the Site are properties within the Bankside Phase I development which is currently under construction. An assessment of construction related impacts in relation to human receptors is therefore considered necessary.

10.4.3 Dust emissions from construction activities are unlikely to result in significant impacts on

ecologically sensitive receptors beyond 50 m from the site boundary. There are no sensitive ecological sites within 50 m of the site boundary therefore the risk of impacts on ecological receptors is negligible and has not been considered any further within this assessment.

10.4.4 As detailed in the baseline section above, PM_{10} concentrations are not monitoring at any location within the district. Data presented in Figure 10.02 indicates background concentrations in the vicinity of the Site are less than 50% of the air quality objective of 40 $\mu g/m^3$. Based on professional experience PM_{10} concentrations at roadside locations are unlikely to be more than a few µg higher than background concentrations. Concentrations in the vicinity of the Site are therefore expected to be less than 24 $\mu g/m^3$.

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

10.4.6 A windrose from Church Lawford Meteorological Station (2016) is provided below in Figure 10.02, which shows that the prevailing wind is from a south-west direction. Properties located to the north-east are therefore most likely to experience significant impacts as a result of dust generated during the construction process. Land-use to the north-east of the Site is currently mainly agricultural land, although the Bankside Phase I development is currently under construction to north of the Site. To ensure a worst-case assessment, the receptors within the Bankside Phase I development have been included in the assessment of construction phase effects.

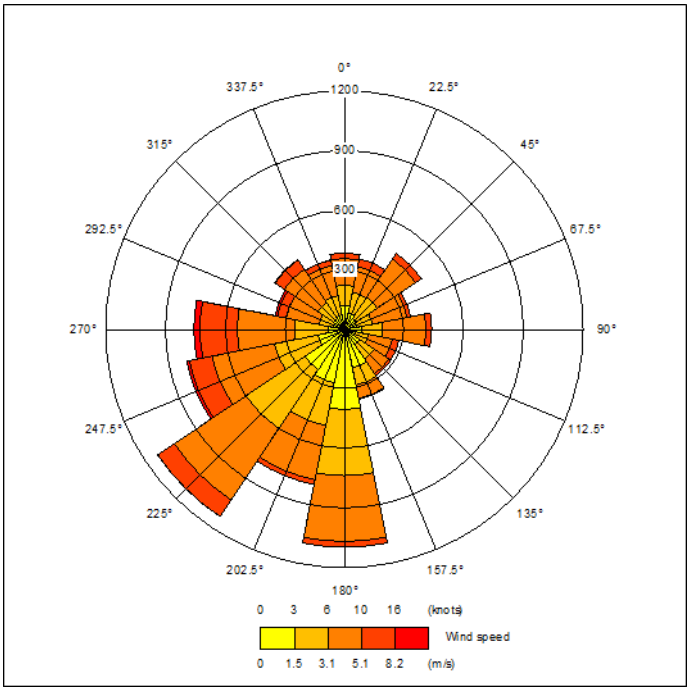

Figure 10.02: Windrose from Church Lawford for 2016

Potential Dust Emission Magnitude

10.4.7 The dust emission magnitude is based on the scale of anticipated works at the Site and has been defined as small, medium or large for each of the three activities; earthworks, construction and trackout. A summary of the dust emission magnitude for each activity is set out in Table 10.06.

Earthworks

10.4.8 Earthworks are those activities involved in preparing the Site for construction such as excavation of material, haulage, tipping, stockpiling and levelling.

10.4.9 During the earthwork activities, it is anticipated that there would be more than 10 earth moving vehicles on the site at any given time and the potential for storage bunds of more than 8m in height. The Site is therefore considered to have a dust emission class of 'large'

with regards to earthwork activities.

Construction

10.4.10 There are a number of issues that can impact the dust emission class during construction activities including the size of the building, materials used for construction, the method of construction and the duration of the build.

10.4.11 Detailed information is currently unavailable on the construction process. Based on the size of the Proposed Development, the Site is considered to have a dust emission class of 'large' with regards to construction activities.

Trackout

10.4.12 The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of trackout.

10.4.13 Given the size of the Proposed Development it is expected that there would be more than 50 Heavy Duty Vehicles (HDV) accessing the Site each day, with the vehicles travelling on site over unpaved roads of more than 100 m in length. The Site is therefore classed as 'large' with regards to trackout activities.

Table 10.06: Summary of Dust Risk Effects Before Mitigation Sensitivity of Surrounding Area

Source	Magnitude
Earthworks	Large
Construction	Large
Trackout	Large

10.4.14 The closest receptors adjacent to the Site are residential properties to the west and the residential properties currently under construction to the north. As set out in the IAQM guidance residential properties are classed as high sensitivity receptors. As there are over 10 within 20 m of the site boundary the overall sensitivity of the surrounding area is classed as high in relation to dust effects.

10.4.15 As detailed above, PM_{10} concentrations in the vicinity of the Site are expected to be less than 24 $\mu g/m^3$. Based on the number and proximity of the residential receptors to the site boundary and the local concentrations of PM_{10} the sensitivity of the surrounding area is considered to be 'low' with regards human health (PM_{10}) effects.

10.4.16 In relation to trackout, vehicles accessing and leaving the Site are expected to travel along Oxford Road to the north or south. There are residential properties within 20 m of the roadside, therefore the sensitivity of the surrounding area to effects from trackout is considered to be 'high' for dust soiling and 'low' for human health (PM_{10}) effects.

10.4.17 A summary of the sensitivity of the area surrounding the Site in relation to each activity is provided below in Table 10.07.

Table 10.07: Summary of Sensitivity of Surrounding Area

Source	Dust Soiling Effects	PM_{10} Effects
Earthworks	High	Low
Construction	High	Low

Trackout	High	Low

Summary of Dust Risk Effects

10.4.18 A summary of the potential dust risk effects prior to mitigation are presented in Table 10.08 below.

Table 10.08: Summary of Dust Risk Effects Before Mitigation

Source	Dust Soiling Effects	PM_{10} Effects
Earthworks	High Risk	Low Risk
Construction	High Risk	Low Risk
Trackout	High Risk	Low Risk

10.4.19 The significance of potential dust impacts following the implementation of mitigation measures are identified later in this report.

Construction Traffic Impact

10.4.20 The greatest impact on air quality due to emissions from vehicles and plant associated with the construction phase will be in the areas immediately adjacent to the site access. It is anticipated that construction traffic will access the site via Oxford Road. It is considered likely that the construction traffic will be low in comparison to the existing traffic flow on this road.

10.4.21 Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, and the likely number of construction vehicles that will be used, the impacts are considered to be of negligible significance.

Operational Phase Impact

NO_2 Concentrations

10.4.22 Annual mean NO_2 concentrations predicted at the selected receptor locations are presented below in Table 10.09.

10.4.23 The results of the modelling assessment indicate that annual mean NO_2 concentrations in 2031, following the completion of the development, will be well the annual mean objective of 40 $\mu g/m^3$ (the AQAL) at all but one of the identified receptor locations. An exceedance of the AQAL is predicted at the bus stop on South Street both without and with the development in place. However, public exposure at this locations will be short-term only and an exceedance of the 1-hour mean objective for NO_2 is considered unlikely based on the predicted annual mean concentrations (guidance referred to earlier in the report indicates that exceedance of the 1-hour objective is unlikely where the annual mean concentration is below 60 $\mu g/m^3$). The significance of the traffic-related impact at this location is therefore considered to be negligible.

10.4.24 Traffic generated by the Proposed Development is predicted to result in a maximum increase in NO_2 concentrations of 0.89 $\mu g/m^3$ (2% of the AQAL) at 27 Arbury Close, which is close to Bankside, where the maximum change in flow is anticipated to occur. However, the predicted concentration (including the background) at this location is 53% of the AQAL and therefore the significance of the impact is negligible.

10.4.25 Annual mean NO_2 concentrations predicted at the receptors located within the development (28 to 33) are well below (less than 75%) the AQAL. It is expected that the 1-hour objective

would also be met at all locations across the Site. As receptors located within the Development Site would not be exposed to NO_2 concentrations above the air quality objectives, the impact with regards new exposure is considered to be negligible.

Table 10.09: Predicted Annual Mean NO_2 Concentrations at Selected Receptors ($\mu g/m^3$)

Receptor	2031 Baseline	2031Baseline + Development	Increase with Development (as a % of the AQAL)	Significance
4 South Bar Street	24.0	24.2	0%	Negligible
21 South Bar Street	23.7	23.8	0%	Negligible
Bus Stop South Bar	44.3	44.7	1%	Negligible
6 Hightown Road	24.3	24.6	1%	Negligible
49 Queensway	18.7	18.7	0%	Negligible
125 Bloxham Road	21.3	21.7	1%	Negligible
45 Horton View	19.9	20.2	1%	Negligible
Bus Stop on Oxford	31.4	31.5	0%	Negligible
24 Farmfield Road	18.0	18.2	0%	Negligible
Horton General	26.3	26.3	0%	Negligible
92 Oxford Road	24.8	24.9	0%	Negligible
132 Oxford Road	23.7	23.7	0%	Negligible
Bus Stop on corner	28.1	28.0	0%	Negligible
The Grange County	19.5	19.4	0%	Negligible
The Grange County	23.1	23.0	0%	Negligible
59 St Annes Road	21.7	21.7	0%	Negligible
164 Oxford Road	25.8	25.7	0%	Negligible
27 Arbury Close	20.5	21.4	2%	Negligible
2 Farm Way	19.1	19.4	1%	Negligible
100 Oxford Road	22.9	22.9	0%	Negligible
Oxford Road	21.1	21.0	0%	Negligible
Cotefield House	23.0	23.0	0%	Negligible
31 Twyford Road	18.8	19.0	0%	Negligible
9 Twyford Gardens	30.5	30.6	0%	Negligible
Adderbury Bowls	22.3	22.4	0%	Negligible
Christopher Rawlins	25.6	25.6	0%	Negligible
Christopher Rawlins	32.5	32.6	0%	Negligible
Within Proposed Development	-	19.6	-	-
Within Proposed Development	-	16.8	-	-
Within Proposed Development	-	16.4	-	-

Within Proposed Development	-	17.5	-	-
Within Proposed Development	-	16.7	-	-
Within Proposed Development	-	17.7	-	-

PM10 Concentrations

10.4.26 Annual mean PM_{10} concentrations predicted at the selected receptor locations are presented below in Table 10.10.

Table 10.10: Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$)

Receptor	2031 Baseline	2031Baseline + Development	Increase with Development (as a % of the AQAL)	Significance
4 South Bar Street	16.6	16.6	0%	Negligible
21 South Bar Street	16.6	16.6	0%	Negligible
Bus Stop South Bar	19.4	19.4	0%	Negligible
6 Hightown Road	16.9	17.0	0%	Negligible
49 Queensway	16.1	16.1	0%	Negligible
125 Bloxham Road	16.4	16.5	0%	Negligible
45 Horton View	16.3	16.3	0%	Negligible
Bus Stop on Oxford	17.9	17.9	0%	Negligible
24 Farmfield Road	16.0	16.1	0%	Negligible
Horton General	17.1	17.1	0%	Negligible
92 Oxford Road	16.9	16.9	0%	Negligible
132 Oxford Road	16.8	16.8	0%	Negligible
Bus Stop on corner	17.5	17.5	0%	Negligible
The Grange County	16.2	16.2	0%	Negligible
The Grange County	16.7	16.7	0%	Negligible
59 St Annes Road	16.5	16.5	0%	Negligible
164 Oxford Road	17.1	17.1	0%	Negligible
27 Arbury Close	16.4	16.5	0%	Negligible
2 Farm Way	16.3	16.3	0%	Negligible
100 Oxford Road	16.7	16.7	0%	Negligible
Oxford Road	16.6	16.6	0%	Negligible
Cotefield House	16.8	16.8	0%	Negligible
31 Twyford Road	16.1	16.1	0%	Negligible
9 Twyford Gardens	17.8	17.8	0%	Negligible
Adderbury Bowls	16.6	16.6	0%	Negligible
Christopher	16.9	16.9	0%	Negligible
Christopher	17.7	17.7	0%	Negligible
Within Proposed Development	-	16.3	-	-

Within Proposed Development	-	15.9	-	-
Within Proposed Development	-	15.8	-	-
Within Proposed Development	-	15.9	-	-
Within Proposed Development	-	15.8	-	-
Within Proposed Development	-	16.0	-	-

10.4.27 The results of the modelling assessment indicate that predicted annual mean PM10 concentrations are less than 50% of the AQAL at the selected receptor locations, both with and without the Proposed Development.

10.4.28 The Proposed Development is predicted to increase PM_{10} concentrations by a maximum of 0.13 µg/m^3 which equates to less than 0.5% of the AQAL. In accordance with the IAQM & EPUK significance criteria as set out in Table 10.02, the impact on local air quality with regards to this pollutant is considered to be negligible.

10.4.29 The number of exceedances of 50 µg/m^3, as a 24-hour mean PM_{10} concentration, has been calculated from the annual mean following the approach set out by Defra in LAQM.TG(16):

$$A = -18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean})$$

where A is the number of exceedances of 50 µg/m^3 as a 24-hour mean PM_{10} concentration.

10.4.30 Based on the above approach, the maximum number of days where PM_{10} concentrations

are predicted to exceed 50 µg/m^3 is between 0 and 3 days at the selected receptors with a change of less than one day as a result of the operational development. The impact on short-term PM_{10} concentrations is therefore also considered to be negligible.

10.4.31 The 24-hour objective is also expected to be met at all locations within the Site. The introduction of new receptors to the Site would not result in exposure to PM_{10} concentrations above the relevant AQS objective levels therefore the impact with regards new exposure is considered to be negligible.

$PM_{2.5}$ Concentrations

10.4.32 Annual mean $PM_{2.5}$ concentrations predicted at the selected receptor locations are presented below in Table 10.11.

Table 10.11: Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m^3)

Receptor	2031 Baseline	2031Baseline + Development	Increase with Development (as a % of the AQAL)	Significance
4 South Bar Street	12.0	12.0	0%	Negligible
21 South Bar Street	12.0	12.0	0%	Negligible
Bus Stop South Bar	13.7	13.7	0%	Negligible
6 Hightown Road	12.2	12.2	0%	Negligible
49 Queensway	11.7	11.7	0%	Negligible
125 Bloxham Road	11.9	11.9	0%	Negligible
45 Horton View	11.8	11.8	0%	Negligible
Bus Stop on Oxford	12.8	12.8	0%	Negligible
24 Farmfield Road	11.6	11.6	0%	Negligible
Horton General	12.3	12.3	0%	Negligible
92 Oxford Road	12.2	12.2	0%	Negligible
132 Oxford Road	12.1	12.1	0%	Negligible
Bus Stop on corner	12.5	12.5	0%	Negligible
The Grange County	11.7	11.7	0%	Negligible
The Grange County	12.0	12.0	0%	Negligible
59 St Annes Road	11.9	11.9	0%	Negligible
164 Oxford Road	12.3	12.3	0%	Negligible

27 Arbury Close	11.8	11.9	0%	Negligible
2 Farm Way	11.8	11.8	0%	Negligible
100 Oxford Road	12.0	12.0	0%	Negligible
Oxford Road	12.0	12.0	0%	Negligible
Cotefield House	12.1	12.1	0%	Negligible
31 Twyford Road	11.7	11.7	0%	Negligible
9 Twyford Gardens	12.7	12.7	0%	Negligible
Adderbury Bowls	12.0	12.0	0%	Negligible
Christopher Rawlins	12.1	12.1	0%	Negligible
Christopher Rawlins	12.6	12.7	0%	Negligible
Within Proposed Development	-	11.8	-	-
Within Proposed Development	-	11.5	-	-
Within Proposed Development	-	11.5	-	-
Within Proposed Development	-	11.6	-	-
Within Proposed Development	-	11.5	-	-
Within Proposed Development	-	11.6	-	-

10.4.33 The results of the modelling assessment indicate that predicted annual mean $PM_{2.5}$ concentrations are less than 50% of the AQAL at the selected receptor locations, both with and without the Proposed Development.

10.4.34 The Proposed Development is predicted to increase $PM_{2.5}$ concentrations by a maximum of 0.1 $\mu g/m^3$ which equates to less than 0.5% of the AQAL. In accordance with the IAQM & EPUK significance criteria as set out in Table 10.02, the impact on local air quality with regards to this pollutant is considered to be negligible both within and outside of the AQMA.

10.5 MITIGATION AND MONITORING

Construction Phase

10.5.1 The control of dust emissions from construction site activities relies upon management provision and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, large- scale operations have been successfully undertaken without impacts to nearby properties.

10.5.2 A high risk of dust soiling impacts and a low risk of human health (PM_{10}) effects is predicted at adjacent receptors during construction of the Proposed Development. Appropriate mitigation measures for the Site have been identified following the IAQM guidance and based on the risk effects presented in Table 10.08. It is recommended that the 'highly recommended' measures set out below are incorporated into a Dust Management Plan (DMP) and approved by CDC prior to commencement of any work on site:

10.5.3 'Highly Recommended' Measures

- develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- display the head or regional office contact information on the site boundary;
- record all dust and air quality complaints, identify cause, 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;
- hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to undertand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes;
- undertake daily on-site and off-site inspection, where receptors area nearby, to monitor, 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;
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to SODC when asked;
- increase frequency of site inspection 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 periods of dry or windy conditions;
- plan 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 as necessary that are at least as high as any stockpiles;
- 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;

- cover, seed or fence stockpiles to prevent wind whipping
- ensure all vehicles switch off engines when stationary – no idling vehicles;
- avoid 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;
- produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials;
- implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing);
- 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 and 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;
- avoid bonfires and burning of waste materials;
- re-vegetate earthworks and exposed areas to stablise surfaces as soon as practicable;
- use hessian, mulches or trackifiers where possible to revegetate or cover with topsoil;
- only remove the cover in small areas during work and not all at once;

- avoid scabbing (roughening or 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;
- use water-assisted dust sweepers on the access and local roads, to remove, as necessary, any material tracked out of the site;
- avoid dry sweeping of large areas;
- ensure vehicles entering and leaving the site are covered to prevent the escape of materials during transport;
- inspect on-site haul routes for integrity and instigate necessary repairs to the surfaces 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) as required;
- ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit.
- Access gates to be located at least 10m from receptors where possible.

10.5.4 The guidance also details the following measure which is considered to be 'desirable'. It is recommended that this measure is also be considered for inclusion within the DMP:

- for smaller supplied of fine powder materials ensure bags are sealed after use and

stored appropriately to prevent dust.

10.5.5 Following implementation of the measures recommended for inclusion within the DMP the impact of emissions during construction of the Proposed Development would be negligible.

Operational Phase

10.5.6 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ predicted at all of the receptors included in the assessment are below the relevant AQS objective levels and the impact on local air quality is predicted to be negligible. The concentrations predicted within the Development Site were all well below (less than 75%) of the relevant AQS objective levels. Therefore, no mitigation is considered necessary.

10.6 CUMULATIVE IMPACTS

10.6.1 Cumulative impacts can potentially be experienced during both the construction and operational phases. During the construction phase, cumulative impacts of dust and particulate matter generated from on-site activities may be experienced in locations in close proximity to two or more development sites where the timing of the construction phases overlap. There may also be an effect due to the increased construction traffic on local roads if construction vehicles are to use the same routes to access the sites. During the operational phase, cumulative impacts may be experienced due to the additional road vehicles generated by one or more schemes if the traffic is likely to affect the same local roads.

10.6.2 A number of nearby committed developments have been considered cumulatively within this assessment, these are outlined in the Noise and Vibration Assessment Chapter 9.

Construction Phase Effects

10.6.3 Guidance provided by the IAQM suggests that effects of dust and particulate matter generated from a construction site may be experienced up to 350m from the site. Of the committed developments considered, only two are close enough to the Site that nearby properties may experience the cumulative effects of dust and particulate matter generated by on-site activities. These are the Bankside Phase I development which is located immediately to the north of the site and the Land South of Colefield Business Park which is located approximately 325m to the southwest of the Site.

10.6.4 A number of properties within Bodicote, in particular along Blackwood Place Road and Molyneux Drive are within 350m of both the Site and the Land South of Colefield Business Park Site. There are also a small number of properties along Oxford Road which are within 350m of the Site and the Bankside Phase I site. The Bankside Phase I site is currently under construction, therefore it is likely that a number of properties within the Phase I development will be occupied before the completion of Phase II. It is therefore possible that these properties may experience increased effects related to dust and particulate matter generation when dust generating activities from on-site works are occurring simultaneously on both Sites.

10.6.5 As discussed previously, with good site practices and applying the recommended mitigation measures the effects of construction dust and particulate matter can be minimised, such that the residual effects are considered negligible. It is considered likely that the operations at the Bankside Phase I site and Land South of Colefield Business Park site would have in place similar mitigation measures as recommended in this chapter. Therefore, it is considered that the residual effects of dust and particulate matter generated

by the combined construction phases would also be negligible.

Operational Phase Effects

10.6.6 The traffic flows used for the assessment include a contribution from the committed developments considered in this assessment. The assessment of the significance of the Proposed Development effects has therefore taken into account the cumulative effect of the Site and the committed development on predicted future pollutant concentrations.

10.7 RESIDUAL IMPACTS

Construction Phase

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

Operational Phase

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

10.8 CONCLUSIONS

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

10.8.2 An assessment of the potential impacts during the construction phase has been carried

out. This has shown that during this phase of the Proposed Development releases of dust and PM_{10} are likely to occur during site activities. Through good site practice and the implementation of suitable mitigation measures, the impact of dust and PM_{10} releases may be effectively mitigated and the resultant impacts are considered to be negligible.

10.8.3 The ADMS model has been used to predict the impact of the Development on local NO_2, PM_{10} and $PM_{2.5}$ concentrations and assess the suitability of the Site for residential use. The assessment found that concentrations of these pollutants would be below the relevant objective levels at all locations, including within the AQMA, and traffic generated by the development proposals would result in a negligible impact on local air quality.

10.8.4 Based on the above information, it is considered that air quality does not pose a constraint to development of the Site as proposed.

REFERENCES

Ref 10.1: EPUK & IAQM (May 2015) Land-Use Planning & Development Control: Planning for Air Quality

Ref 10.2: Institute of Air Quality Management, (February 2014), Guidance on the Assessment of Dust from Demolition and Construction.

Ref. 10.3: http://uk-air.defra.gov.uk

Ref. 10.4: Department for Environment, Food and Rural Affairs (DEFRA), (2016): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(16)

Ref. 10.5: D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites (July 2003)

Ref. 10.6: Air Quality Directive 2008/50/EC

Ref. 10.7: The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – July 2007

Ref. 10.8: The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928 Ref. 10.9: The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043

Ref. 10.10: The Air Quality Standards Regulations 2010 – Statutory Instrument 2010 No. 1001 Ref.

Ref. 10.11: Communities and Local Government: National Planning Policy Framework (March 2012)

Ref. 10.12: Office of the Deputy Prime Minister: Planning Policy Statement 23: Planning and Pollution Control (Oct 2004)

Ref. 10.13: Department for Communities and Local Government, National Planning Policy Framework, July 2018 (Updated February 2019)