15.0 Air Quality

15.1 Introduction

This chapter presents the approach and findings of the Air Quality assessment prepared by WYG.

The chapter sets out the methodology followed, and provides a review of the baseline air quality in the vicinity of the proposed site and surrounding area and then presents the results of the assessment of air quality associated with the proposed development (both construction and occupational phases) in order to determine the anticipated magnitude and significance of impact.

Mitigation measures are presented and discussed to minimise the air quality impacts associated with the proposals during the construction and occupation phases of the development.

Appendices	Title
Appendix O1	Air Quality Assessment

15.2 Scoping and Consultation

15.2.1 Scoping Assessment Stage

A scoping report was submitted in June 2014 (*Appendix B1*) for the proposed development, which outlined the scope of the proposed works and the topic areas to be assessed in the ES which have the potential to give rise to significant environmental effects.

West Berkshire Council had the following comments in their Scoping Opinion (*Appendix B2*):

"Natural England note in Annex 2 of this letter that the ES should take account of the risk of air pollution and how these can be managed or reduced. Further information on air pollution impact and the sensitivity of different habitats/designated sites can be found on Air Pollution Information Systems (www.apis.ac.uk). Further information on air pollution modelling and assessment can be found on the Environmental Agency website.

It is considered that the approach provided in the SR in respect to air quality is acceptable."

During the construction phase, the assessment addresses potential effects due to dust associated with earthworks, construction and trackout. Construction traffic is not included in the scope of the assessment.

During occupation, the assessment considers the potential effects of traffic emissions associated with the proposed development.

15.3 Assessment Methodology

15.3.1 *Policy and Legislation Background*

European air quality legislation is consolidated under Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidates previous legislation which was designed to deal with specific pollutants in a consistent manner and provides new air quality objectives for fine particulates.

UK Legislation

The Air Quality Standards Regulations (Amendments 2016) sought to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directives. The Air Quality Limit Values are transposed into the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives.

The UK Air Quality Strategy is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the impacts of air pollution.

For each nominated pollutant, the Air Quality Strategy sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations (2000) SI 928, and subsequent amendments.

The AQOs for pollutants included within the Air Quality Strategy are presented in *Table 15.1* and *Table 15.2* along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines.

Table 15.1 – Human Health Air Quality Standards, Objectives, Limit and Target Values

Pollutant	Applies	Objective	Concentration Measured as[10]	Date to be achieved and maintained thereafter	European Obligations	Date to be achieved and maintained thereafter	New or existing
PM_{10}	UK	50µg/m^3 (max 35 exceedances a year)	24-hour mean	1st January 2005	50µg/m^3 by end of 2004 (max 35 exceedances a year)	1st January 2005	Retain Existing
	UK	40µg/m^3 by end of 2004	Annual mean	1st January 2005	40µg/m^3	1st January 2005	
$PM_{2.5}$	UK	25µg/m^3	Annual Mean	31st December 2010	25µg/m^3	1st January 2010	Retain Existing
Nitrogen Dioxide (NO_2)	UK	200µg/m^3 not to be exceeded more than 18 times a year	1 Hour Mean	31st December 2005	200µg/m^3 not to be exceeded more than 18 times a year	1st January 2010	Retain Existing
	UK	40µg/m^3	Annual Mean	31st December 2005	40µg/m^3	1st January 2010	

The ecological limits shown in *Table 15.2* are based on CLRTAP and WHO guidance.

Table 15.2 – Ecological Air Quality Standards, Objectives, Limit and Target Values			
Pollutant	**Applies**	**Objective**	**Concentration Measured as[10]**
NO_X	UK	30µg/m^3	Annual Mean

National Planning Practice Guidance

The National Planning Policy Framework (NPPF), revised February 2019, principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. The NPPF broadly retains the principles of PPS:23: Planning and Pollution Control 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 or 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 or 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'

The National Planning Practice Guidance (NPPG) web-based resource was updated by the Ministry for Housing, Communities and Local Government (MHCLG) on the 1st November 2019 to support the National Planning Policy Framework and make it more accessible. In relation to air quality, the PPG states that:

"The 2008 Ambient Air Quality Directive sets legally binding limits for concentrations in outdoor air of major air pollutants that affect public health such as particulate matter (PM10 and PM2.5) and nitrogen dioxide (NO2).

The UK also has national emission reduction commitments for overall UK emissions of 5 damaging air pollutants:

- *fine particulate matter ($PM_{2.5}$)*
- *ammonia (NH_3)*
- *nitrogen oxides (NO_x)*
- *sulphur dioxide (SO_2)*
- *non-methane volatile organic compounds (NMVOCs)*

As well as having direct effects on public health, habitats and biodiversity, these pollutants can combine in the atmosphere to form ozone, a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems. Odour and dust can also be a planning concern, for example, because of the effect on local amenity."

Local Authority Pollution Control

LAs, including West Berkshire Council (WBC) have formal powers to control air quality through a combination of Environmental Permitting, Local Air Quality Management (LAQM) and by use of their wider planning policies.

West Berkshire Council Local Plan

The West Berkshire Local Plan includes the Core Strategy Development Plan Document (DPD) (adopted July 2012), the Housing Site Allocations DPD (adopted May 2017) and the West Berkshire District Local Plan (Saved Policies 2007). Whilst there are no policies specific to air quality, the following policies have been identified as relevant to air quality;

"Environmental nuisance and pollution control (OVS. 5):

The Council will only permit development proposals where they do not give rise to an unacceptable pollution of the environment. In order to minimise the adverse impact on the environment or loss of amenity proposals should have regard to:

a) the need to ensure the adequate storage and disposal of waste materials; and

b) the installation of equipment to minimise the harmful effects of emissions; and

c) the hours, days or seasons of operations; and

d) locating potential nuisance or pollution activities onto the least sensitive parts of the site or where the impacts can be best contained by physical or other appropriate measures."

"Policy CS 13: Transport;

Development that generates a transport impact will be required to:

…

Minimise the impacts of all forms of travel on the environment and help tackle climate change."

15.3.2 *Guidance*

Construction Phase

The construction phase assessment utilises the appropriate guidance by the Institute of Air Quality Management and the Design Manual for Roads and Bridges[1].

A full explanation of the methodology is contained in the *Appendix O1*.

[1] IAQM Guidance on the Assessment of Dust from Demolition and Construction document and section 3.45 of the Volume 11 Section 3 of the Design Manual for Roads and Bridges

Occupation Phase

The occupation assessment sensitivity is based on the potential magnitude of change at receptors based on existing pollutant levels at these receptors, i.e. receptors already experiencing an exceedance of the AQO are deemed more sensitive.

The occupation phase assessment consists of the quantified predictions of the change in NO_2, PM_{10} and $PM_{2.5}$ of the development due to changes in traffic movement. Predictions of air quality at the site have been undertaken for the occupation phase of the development using Atmospheric Dispersion Modelling Software (ADMS) 4.1.1. ADMS software is used to model NO_2, PM_{10} and $PM_{2.5}$ emitted from traffic emissions, which predicts the changes in levels of both pollutants experienced due to the changes in traffic levels and distribution in traffic as a result of the proposed link roads and the proposed development and other cumulative developments

The significance of the effects during the occupation phase of the development is based on the latest guidance[2]. The guidance lays a basis for a consistent approach that could be used by all parties associated with the planning process to professionally judge the overall significance of the air quality effects based on severity of air quality impacts.

15.3.3 *Defining the study area*

The Air Quality assessment has considered receptors within 200m of roads which are expecting to experience a change of 500 daily vehicle trips or more as per the IAQM guidance.

The study area is shown in *Appendix O1* which covers the same geographical extent as the traffic assessment which has identified where there is likely to be a significant change in traffic.

15.3.4 *Sensitivity of Receptors*

Receptors can demonstrate different sensitivities to changes in their environment. For the purpose of this assessment sensitivity is determined as Very High, High, Medium, Low and Negligible as detailed in *Table 15.3*.

[2] The latest guidance was produced by EPUK and IAQM in January 2017.

Table 15.3 - Methodology for Assessing Sensitivity of Receptor	
Sensitivity	**Criteria**
Very High	• Do Minimum pollutant concentration at ⩾110 of the AQAL (Emissions). • Receptors of very high sensitivity to dust and odour, such as: hospitals and clinics, retirement homes, painting and furnishing, hi-tech industries and food processing (Construction). • Densely populated areas – more than 100 dwellings within 20m of the development site (Construction).
High	• Do Minimum pollutant concentration already 103-109 of the AQAL (Emissions). • Receptors of high sensitivity to dust and odour, such as: schools, residential areas, food retailers, glasshouses and nurseries, horticultural land and offices (Construction). • Densely populated areas – 10-100 dwellings within 20m of the development site (Construction).
Medium	• Do Minimum pollutant concentration between 95 - 102% of the relevant AQO (Emissions). • Receptors of medium sensitivity to dust and odour, such as: farms, outdoor storage, light and heavy industry (Construction). • Suburban or edge of town areas (Construction).
Low	• Do Minimum pollutant concentration between 75-90% of the relevant AQO (Emissions) • All other dust/odour sensitive receptors not identified above (Construction). • Rural/Industrial areas (Construction).
Negligible	• Concentration less than 75% of the relevant AQO (Emissions) • Receptor more than 350m away (construction)

15.3.5 *Magnitude of Impact*

Table 15.4 provides the criteria used for the classification of the magnitude of likely significant air quality impacts.

Table 15.4 - Method for Assessing Magnitude of Likely Significant Impacts on Air Quality		
Magnitude (1)	**Description**	**Examples**
Large	Impact resulting in a considerable change in baseline environmental conditions with severe undesirable/desirable consequences on the receiving environment.	• Air quality varies between the do minimum and do something by more than 10% of the air quality criterion (Emissions). • Substantial risk that emissions will generate statutory nuisance complaints, resulting in formal action (Construction).
Medium	Impact resulting in a discernible change in baseline environmental conditions with undesirable/desirable conditions	• Air quality varies between the do minimum and do something by 5 - 10% of the air quality criterion (Emissions). • Moderate risk that emissions will generate statutory nuisance complaints, resulting in formal action (Construction).
Small	Impact resulting in a discernible change in baseline environmental conditions with undesirable/desirable conditions that can be tolerated.	• Air quality varies between the do minimum and do something by 1 - 5% of the air quality criterion (Emissions). • Slight risk that emissions will generate statutory nuisance complaints, resulting in formal action (Construction).

Table 15.4 - Method for Assessing Magnitude of Likely Significant Impacts on Air Quality		
Magnitude (1)	**Description**	**Examples**
Imperceptible	Very low discernible change in baseline environmental conditions.	• Air quality varies between the do minimum and do something by less than 1-2% of the air quality criterion (Emissions). • Little or no cause for nuisance complaints to be made (Construction).
Neutral	No change in baseline conditions	• Air quality varies between the do minimum and do something by less than 0.5% of the air quality criterion (Emissions).

NOTE (1) An impact's magnitude can be either positive or negative, except for imperceptible or neutral.

It is recognised that likely significant air quality impacts can operate over a range of geographical areas and therefore a geographical scale may be taken into account in describing the scale/magnitude of the likely significant impact.

15.3.6 *Significance of Effect*

The level of significance of each likely effect is determined by combining the magnitude of change with the sensitivity of the receptor. *Table 15.5* shows how the interaction of magnitude and sensitivity results in the significance of an environmental effect. If the scale of the impact magnitude is negative, then the resulting effect is adverse. If the scale of the impact magnitude is positive, then the resulting effect is beneficial.

The matrix in *Table 15.5* correlates with the significance matrix in IAQM guidance[3].

Table 15.5 - Impact Significance Matrix				
Sensitivity of Receptor	**Magnitude of Change**			
	Imperceptible	**Small**	**Medium**	**Large**
Negligible	Negligible	Negligible	Negligible	Minor
Low	Negligible	Negligible	Minor	Moderate
Medium	Negligible	Minor	Moderate	Substantial
High	Negligible	Moderate	Substantial	Substantial
Very High	Negligible	Substantial	Substantial	Substantial

15.3.7 *Traffic Data*

Traffic data has been provided by Vectos Traffic Consultants in 24hr Annual Average Weekday Traffic (AADT) format for the years 2017 and 2031. HGV percentages have also been provided. The 'with development' flows are presented as the 'Do Something' (DS) and the 'without development' flows presented as the 'Do Minimum' (DM).

A TEMPRO factor of 1.01 has been applied to the 2017 traffic data to provide 2018 baseline data. This was applied to correspond with the latest LA monitoring data and meteorological data.

[3] This significance matrix is recommended by Development Control: Planning for Air Quality, 2017.

Additionally, traffic data (baseline 2018, 'do minimum' and 'do something' 2031) from surrounding Air Quality Assessments have been obtained to include as part of the assessment.

The following scenarios have been assessed:

1. 2018 Baseline = Existing Baseline Conditions;
2. 2031 "Do Minimum" = Baseline Conditions + Committed Development Flows;
3. 2031 "Do Something 1" = Baseline Conditions + Committed Development Flows + Proposed Development Flows (with Bloor Homes Development – three accesses); and,
4. 2031 "Do Something 2" = Baseline Conditions + Committed Development Flows + Proposed Development Flows (with Strategic Development – four accesses).

Scenario 2 incorporates traffic flows from the cumulative developments outlined in *Chapter 2* of the ES.

15.3.8 *Emission Factors*

The Emission Factor Toolkit[4] for road traffic emission factors was utilised to predict emission rates for the occupation phase assessment.

15.3.9 *Limitations of the Assessment*

In consideration of the methodology for adjusting background concentrations as contained within the Defra LAQM Note on Projecting NO_2 concentrations (April 2012), the assessment has assumed that there will be improvements in background air quality.

2018 background concentrations have been used for the model verification and baseline results. Details of background concentrations used for the assessment are presented in Table 6.2 of *Appendix O1*.

Additionally, the Emissions Factor Toolkit and Defra NO_x-to-NO_2 Calculator only calculate emissions up to the year 2030. With our operational year being 2031, it is thought that the emissions will be greater during 2030. Therefore, with the emissions being greater during 2030 this assessment will be higher than 2031 predictions would be.

The traffic data provided by Vectos included VISSIM traffic flow data. These VISSIM traffic flow data included 100 dwellings from Sandleford Park West accessed via Warren Road, so an assessment of the proposed Sandleford Park scheme in isolation was not possible.

The air quality assessment as part of this ES chapter has considered the effects of the Proposed Development on local air quality. Although not committed, the neighbouring Sandleford Park West development has been included as a cumulative development within this assessment. Therefore this assessment is considered to be worst-case.

[4] Version 9.0 (May 2019) was utilised for the purpose of the assessment

Due to the availability of traffic data for the modelling assessment, some baseline, future baseline (without development) and predicted opening year (with development) data has been sourced from the neighbouring Sandleford Park West planning application.

15.4 Baseline Conditions

Baseline air quality in the vicinity of the proposed development site has been defined from a number of sources, as described in the following sections.

15.4.1 *Air Quality Review and Assessment*

As required under section 82 of the Environment Act 1995, WBC has conducted an ongoing exercise to review and assess air quality within its area of jurisdiction. WBC has designated two Air Quality Management Areas (AQMAs) which are described below:

- West Berkshire Thatcham AQMA: Part of the A4 in Thatcham from the harts Hill road junction to the junction with the Broadway; and,
- Newbury AQMA: An area encompassing the roundabout junction of the A339, A343 and Greenham Road in Newbury.

The proposed development is 1.2 km south-west of the Newbury AQMA. Due to the proximity, receptors within the AQMA have been included within the modelling assessment.

Background concentrations as used within the prediction calculations were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the development site. In May 2019, DEFRA issued revised 2017 based background maps for NO_X, NO_2, PM_{10} and $PM_{2.5}$ which incorporate updates to the input data used for modelling. 2018 background maps have been utilised for the model verification and baseline occupation phase assessment.

15.4.2 *Air Quality Monitoring*

Continuous Monitoring

WBC operates a network of automatic monitoring stations within their jurisdiction. The monitored result for CM1 is presented in *Table 15.6*:

Table 15.6 - Automatic Monitoring Results West Berkshire Council

ID	Site Description	Site Type	Distance from Kerb (m)	Inlet Height (m)	2018 NO_2 Annual Mean Concentration (µg/m^3)
CM1	Newbury A343, A339 & Greenham Road Junction	Roadside	4.7	1.8	36.0

As indicated in *Table 15.6*, the automatic monitoring station exceeded the AQO (40µg/m^3 annual mean) in 2016.

Nitrogen Dioxide Diffusion Tube Monitoring

Diffusion tube monitoring is conducted at various sites across the WBC area as shown in Figure 1 of *Appendix O1*.

It should be noted that WBC has re-named their diffusion tube monitoring network which has been used as part of this assessment. However, for comparison, the 2018 report references have been included within *Table 15.7*.

The results for the closest NO_2 diffusion tube monitoring locations are presented in *Table 15.7* below:

Table 15.7 - Diffusion Tube Monitoring Results West Berkshire Council

Site ID	2018 Report Ref	Site Description	Site Type	Distance from Kerb (m)	Inlet Height (m)	2018 NO_2 Annual Mean Concentration ($\mu g/m^3$)
WB1	D1	A339 Newbury Central	Kerbside	1.90	2.30	29.4
WB15	D22	44 Hambridge Road Newbury	Urban Background	4.30	2.45	26.0
WB16	D23	42 Kings Road Newbury	Roadside	11.30	1.85	23.0
WB17	D24	1 Winchester Court Newbury	Roadside	4.95	3.00	36.0
WB18	D25	Continuous monitor 1, A343, A339and Greenham Road Newbury	Roadside	4.70	1.80	36.3
WB19	D28	64 Greenham Road Newbury	Roadside	2.00	2.20	26.2
WB20	D29	20 Deadmans Lane Greenham	Suburban	10.50	2.10	23.0
WB22	D31	3 Howard Road Newbury	Roadside	11.00	2.60	22.0
WB23	D32	1 St John's Road Newbury	Roadside	4.80	2.25	31.0
WB24	D33	63 St John's Road Newbury	Urban Background	6.20	2.20	25.0
WB25	D34	40 Bartholomew Street Newbury	Roadside	2.70	2.20	29.0
WB26	D35	6 Market Street Newbury	Urban Centre	1.30	2.10	24.9
WB31	D44	Abbeydale Monks Lane Newbury	Kerbside	2.00	2.50	15.4
WB32	D45	A343 Andover Road Wash Common	Kerbside	0.75	2.25	14.2

15.4.3 *Traffic Emission Sources*

Desktop assessment has identified that traffic movements are likely to be the most significant local source of pollutants affecting the site and its surroundings. The principal traffic derived pollutant likely to impact local receptors is nitrogen dioxide (NO_2).

15.4.4 *Meteorology*

Meteorological conditions have significant influence over air pollutant concentrations and dispersion. Pollutant levels can vary significantly from hour to hour as well as day to day, thus any air quality predictions need to be based on detailed meteorological data. The ADMS model calculates the dispersion of pollutants on an hourly basis using a year of local meteorological data. The 2018 meteorological data used in the assessment is derived from Middle Wallop Meteorological Station. This is the nearest meteorological station, which is considered representative of the development site, with all the complete parameters necessary for the ADMS model.

15.4.5 *Sensitive Receptors for Air Quality Assessment*

Receptors that are considered as part of the air quality assessment are primarily those existing receptors that are situated along routes predicted to experience significant changes in traffic flow as a result of the Proposed Development. The sensitivity of receptors is considered to be **high**. These have been identified in the following sections. These have been included within the modelling assessment as described in *Table 15.8*.

Ecological Sensitive Receptors

The IAQM guidance on 'Air Quality Impacts on Designated Nature Conservation Sites' (2019) document outlines the types of designated nature sites within 2 km of the proposed development which require air quality assessment. These are inclusive of;

- Sites of Special Scientific Interest (SSSIs);
- Special Areas of Conservation (SACs);
- Special Protection Areas (SPAs);
- Ramsar Sites;
- Areas of Special Scientific Interest (ASSIs);
- National Nature Reserves (NNRs);
- Local Nature Reserves (LNRs);
- Local Wildlife Sites (LWSs); and
- Areas of Ancient Woodland (AW).

The Conservation of Habitats and Species Regulations (2017) additionally requires competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Protection Areas).

A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within the extents of the dispersion modelling assessment. This was completed using the Multi-Agency Geographic Information for the Countryside (MAGIC) web-based interactive mapping service, which draws together information on key environmental schemes and designations.

Following a search within a 2 km radius of the site boundary, twenty ecological receptors were identified. It should also be noted that several sites were raised during the Scoping

Response where it was requested the effects of Air Quality associated with vehicles should be assessment. All ecological sites identified are shown in *Table 15.9*.

Emission Sensitive Receptors

The Design Manual for Roads and Bridges (DMRB) considers receptors within 200m of a road source to be potentially affected by that operation. These receptors are shown both in Figures 2 and 3 of *Appendix O1*.

The AQOs only apply at locations where the public may be exposed to pollution for a sufficient period for there to be a measurable health impact. The averaging period and AQO involved will determine which locations are considered to be sensitive receptors. For annual mean NO_2 and particulate matter with mean hydraulic diameter of less than 10µm) AQOs, LAQM.TG(16) considers typical locations for sensitive receptors to include:

- Residential properties;
- Hospitals;
- Schools; and,
- Care homes.

Appendix O1 identifies high sensitivity roadside residential receptors that are representative of worst-case exposure locations and have been chosen as the closest residences to each road which may be affected by the traffic associated with the proposed development. The list of human health sensitive receptors identified are shown in *Table 15.8*. With the list of ecological sensitive receptors identified are shown in *Table 15.9*.

Table 15.8 - Human Health Sensitive Receptor Locations

Discrete Sensitive Receptor		UK NGR (m)	
		X	Y
R1	7 Penwood Road, The Chestnuts,	445196	163149
R2	325a Andover Road	445515	163704
R3	266 Andover Road	445595	164010
R4	77 Andover Road	446098	164372
R5	Kendrick Road Kimberleys	445866	164397
R6	257 Andover Road	445799	164429
R7	Park House School South Building	446060	164570
R8	Warren Road	445985	164569
R9	241 Warren Road (N façade)	445868	164590
R10	176 Andover Road	445911	164810
R11	17 Dormer Road	446028	164826
R12	225 Andover Road	446014	164988
R13	77 Monks Lane	446217	165061
R14	211b Andover Road	446095	165087
R15	35 Bodin Gardens (adjacent to A339)	446242	165309
R16	125 Andover Road	446497	165736
R17	79 Andover Road	446622	165995
R18	34 Andover Road	446752	166248
R19	1 St Johns Road	447035	166436

Table 15.8 - Human Health Sensitive Receptor Locations			
Discrete Sensitive Receptor		**UK NGR (m)**	
		X	**Y**
R20*	63 St Johns Road	447375	166534
R21	1 Winchester Court	447409	166559
R22*	A339 (20 m south of the continuous monitoring station at Newbury)	447414	166539
R23	8 Eeklo Place (adjacent to A339)	447475	166332
R24	66 Priory Road (adjacent to A339)	447409	166014
R25	61 Dickens Walk (adjacent to A339)	447450	165730
R26	35 Bodin Gardens (adjacent to A339)	447434	165548
R27	2 Sandleford Parade (adjacent to A339)	447331	165314
R28	4 Deadmans Lane (adjacent to A339)	447504	164857
R29	7 Sandleford Farm (adjacent to A339)	447519	164583
R30	32 Monks Lane	446971	165317
R31	52 Monks Lane	446813	165286
R32	2 Heather Gardens	446485	165169

Table 15.9 – Ecological Sensitive Receptor Locations			
Discrete Sensitive Receptor		**UK NGR (m)**	
		X	**Y**
E1	Herbert Plantation	447375	162322
E2	Greenham and Crookham Commons	447910	164712
E3	Greenham and Crookham Commons	447971	164030
E4	Ancient Woodland ID 1487149	446702	164033
E5	Ancient Woodland ID 1495577	446586	164544
E6	Ancient Woodland ID 1495139	449056	163944
E7	Ancient Woodland ID 1495279	448947	164309
E8	Barn Copse	446224	164748
E9	Crambow Gully	447786	163394
E10	Crooks Copse	446897	165180
E11	High Wood	446760	164870
E12	High Wood	447220	164444
E13	Newtown Grange Wood	447262	163187
E14	Lillismoor Copse	449076	163213
E15	Peckmoor Copse	448226	163933
E16	Peckmoor Copse	448180	163980
E17	Reddings Copse	444703	164410
E18	Oaken Copse	444791	165080
E19	Young Copse	448550	165981
E20	West Wood	448123	165810

15.5 Mitigation Measures

15.5.1 Inherent Mitigation Measures

The following mitigation measures are incorporated into the proposed development:

- A stand-off/buffer from the recycling centre;
- On-site local centre and primary school to reduce vehicle trips;
- New footpaths and cycleways; and
- Implementation of a travel plan.

15.5.2 Standard Mitigation Measures

Mitigation measures to be implemented during the construction phase are detailed in the accompanying draft CEMP in *Appendix D1*.

15.5.3 Actionable Mitigation Measures

No actionable mitigation is proposed.

15.6 Assessment of Environmental Impacts

15.6.1 Impact Assessment

Construction Phase

Based on the methodology detailed in the AQA Technical Report and prior to the implementation of appropriate mitigation measures, the potential significance of dust emissions associated with the construction phase is presented in *Table 15.10*. The assessment is based on the nearest sensitive receptors to each source activity. As the assessment of potential dust impacts has been undertaken qualitatively based on the construction scenario set out in *Chapter 4*, confidence in these predictions is **high**.

It should be noted that all impacts have been assessed based on the distance between the planning application boundary and the receptor location. The majority of dust generating activities are unlikely to be undertaken at the development boundary and therefore the distance to the sensitive area would usually be greater than those used in the assessment. Predicted impacts are therefore based on a worst-case scenario.

Table 15.10 - Summary Risk of Impacts Prior to Mitigation

Source	Dust Soiling	Health Impacts of PM_{10}	Ecological
Demolition	N/A	N/A	N/A
Earthworks	Substantial	Minor	Substantial
Construction	Substantial	Minor	Substantial
Trackout	Substantial	Minor	Substantial

All impacts presented within *Table 15.10* are predicted with regard to the potential for dust nuisance complaints and surface soiling events due to deposition, as opposed to the risk of exceeding any AQOs.

All dust impacts are considered to be direct, temporary, short-term and reversible in nature. The impacts are determined to be direct as they occur as a result of activities associated with the development, temporary as they will only potentially occur during the construction phase, short-term because these will only arise at particular times when certain activities and meteorological conditions for creating the level of magnitude predicted combine, and reversible as conditions will return to baseline upon cessation of construction phase activities.

Following the implementation of mitigation measures detailed in the draft CEMP, the effects arising from the construction phase are considered **negligible**.

Occupation Phase

Vehicle movements associated with the proposed development will generate additional exhaust emissions, such as NO_2, PM_{10} and $PM_{2.5}$, on the local and regional road networks.

The likely significant impacts of road vehicle exhaust emissions has been undertaken for the following assessment scenarios considering the Sandleford Park development in isolation:

- 2018 Baseline = Existing Baseline Conditions;
- 2031 “Do Minimum” = Baseline Conditions + Committed Development Flows ; and,
- 2031 “Do Something 1” = Baseline Conditions + Committed Development Flows + Proposed Development Flows (with three access scenario).

Nitrogen Dioxide

Predicted annual mean NO_2 concentrations were assessed against the AQO of 40 µg/m^3. Reference should be made to the AQA Technical Report (*Appendix O1*) for detailed results tables of predicted annual mean NO_2 concentrations.

As indicated in the AQA Technical Report, the annual mean NO_2 concentration at surrounding existing receptors from the effects of traffic is predicted to be neutral at all identified receptors. The effects at these locations are considered to be **negligible**, in accordance with the stated assessment methodology and as such is not considered to be significant. All impacts are considered to be **direct**, **permanent**, **long-term** and **irreversible** in nature.

Confidence in these predictions is high given that a detailed dispersion modelling assessment has been undertaken using traffic data provided by Vectos and modelling results have been verified, which is considered to be a robust approach.

Particulate Matter

Predicted annual mean ground level PM_{10} and $PM_{2.5}$ concentrations were assessed against the annual average AQOs of 40 µg/m^3 for PM_{10} and 25 µg/m^3 for $PM_{2.5}$ respectively. Reference should be made to the AQA Technical Report for detailed results tables of predicted annual mean ground level PM_{10} and $PM_{2.5}$ concentrations.

As indicated in the AQA Technical Report, the likely impacts on annual mean PM_{10} and $PM_{2.5}$ concentrations from the development traffic flows is predicted to be neutral at all identified receptors. The effects at these locations are considered to be **negligible** in accordance with the stated assessment methodology and as such is not considered to be significant.

Confidence in these predictions is high given that a detailed dispersion modelling assessment has been undertaken using traffic data provided by Vectos Transport Consultants and modelling results have been verified, which is considered to be a robust approach.

Table 15.11 - Summary of Impact Assessment – Occupation Phase						
Receptor	**Sensitivity**	**Description of Impact**	**Inherent & Standard Mitigation Measures**	**Magnitude of Effect**	**Type of Effect**	**Significance of Effect**
Existing & Proposed Sensitive Receptors	High	Impact of NO_2 emissions generated by road vehicles during occupational phase	<u>Inherent Mitigation</u> A stand-off/buffer from the recycling centre On-site local centre to reduce vehicle trips New footpaths and cycleways Implementation of a travel plan	Negligible	Permanent, Long-term, Direct	Negligible
		Impact of PM_{10} emissions generated by road vehicle movements during occupational phase				
		Impact of $PM_{2.5}$ emissions generated by road vehicle movements during occupational phase				

15.6.2 Residual Impact Assessment

As no actionable mitigation is proposed, residual effects are as set out in *Section 15.6.1*.

15.7 Cumulative Impact Assessment

15.7.1 Sandleford Park West

Construction

It is anticipated that committed developments around the site will all employ the same level of mitigation as proposed within this assessment during the construction phase and as such, **negligible** cumulative effects are predicted.

Occupation Phase

Vehicle movements associated with the cumulative development including traffic from Sandleford Park West has been modelled. The likely significant impacts of cumulative road vehicle exhaust emissions has been undertaken for the following assessment scenarios:

- 2018 Baseline = Existing Baseline Conditions;
- 2031 "Do Minimum" = Baseline Conditions + Committed Development Flows (with Sandleford Park West); and,
- 2031 "Do Something 2" = Baseline Conditions + Committed Development Flows (with Sandleford Park West) + Proposed Development Flows

Nitrogen Dioxide

Predicted annual mean NO_2 concentrations were assessed against the AQO of 40 µg/m^3. Reference should be made to the AQA Technical Report (*Appendix O1*) for detailed results tables of predicted annual mean NO_2 concentrations.

As indicated in the AQA Technical Report, the annual mean NO_2 concentration at surrounding existing receptors from the effects of traffic is predicted to be neutral at all identified receptors. The effects at these locations are considered to be **negligible**, in accordance with the stated assessment methodology and as such is not considered to be significant. All impacts are considered to be **direct**, **permanent**, **long-term** and **irreversible** in nature.

Confidence in these predictions is high given that a detailed dispersion modelling assessment has been undertaken using traffic data provided by Vectos and modelling results have been verified, which is considered to be a robust approach.

Particulate Matter

Predicted annual mean ground level PM_{10} and $PM_{2.5}$ concentrations were assessed against the annual average AQOs of 40 µg/m^3 for PM_{10} and 25 µg/m^3 for $PM_{2.5}$ respectively.

Reference should be made to the AQA Technical Report for detailed results tables of predicted annual mean ground level PM_{10} and $PM_{2.5}$ concentrations.

As indicated in the AQA Technical Report, the likely impacts on annual mean PM_{10} and $PM_{2.5}$ concentrations from the development traffic flows is predicted to be neutral at all identified receptors. The effects at these locations are considered to be **negligible** in accordance with the stated assessment methodology and as such is not considered to be significant.

Confidence in these predictions is high given that a detailed dispersion modelling assessment has been undertaken using traffic data provided by Vectos Transport Consultants and modelling results have been verified, which is considered to be a robust approach.

15.8 Summary

An assessment of air quality effects has been undertaken, primarily considering the traffic emissions and construction effects of the proposed development and also cumulative effects with Sandleford Park West and other developments.

The predicted levels of pollutants, including the effects of the traffic from the proposed development and surrounding committed schemes, including 100 dwellings associated with the adjacent development at Sandleford Park West, are all within the required criteria. The effects are therefore, determined to be **negligible** during both the construction and occupation phases of the proposed development.

The predicted levels of pollutants, including the effects of the traffic from the proposed development and surrounding committed schemes, including the full Sandleford Park West scheme, are all within the required criteria. The cumulative effects are therefore, determined to be **negligible** during both the construction and occupation phases.