

CHAPTER 10: AIR QUALITY

Introduction

10.1 This Chapter presents the methodology followed, and provides a review of the baseline air quality in the vicinity of the site and surrounding area. The Chapter then presents the results of the assessment of air quality associated with the proposed development 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.

Methodology

10.2 The general assessment methodology utilised is described in Chapter 1. Any variations in this methodology have been described in the following sub-sections.

Predicting Magnitude of Impact

10.3 The magnitude of potential impacts during both construction and operation of the proposed development has been assessed using the criteria presented in Table 10.1.

Table 10.1 Methodology for Assessing Magnitude of Impacts on Air Quality

Magnitude	Description	Examples
Substantial	Impact resulting in a considerable change in environmental conditions with severe undesirable/desirable consequences on the receiving environment, as a result of the development.	<ul style="list-style-type: none">• Variation in predicted concentration of more than 10% of the air quality criterion.• Large risk that emissions will generate statutory nuisance complaints, resulting in formal action.• Area affected is less than 10m from an active construction site.
Moderate	Impact resulting in a discernable change in environmental conditions with undesirable/desirable conditions or possibly causing statutory objectives to be exceeded, as a result of the development.	<ul style="list-style-type: none">• Variation in predicted concentration of 5-10% of the air quality criterion.• Medium risk that emissions will generate statutory nuisance complaints, resulting in formal action.• Area affected is within 100m of a major active construction site.

Magnitude	Description	Examples
Slight	Impact resulting in a discernable change in environmental conditions with undesirable/desirable conditions that can be tolerated, as a result of the development.	<ul style="list-style-type: none"> Variation in predicted concentration of 1-5% of the air quality criterion. Small risk that emissions will generate statutory nuisance complaints, resulting in formal action. Area affected is between 100m and 1,000m of a major active construction site or up to 100m from a minor active construction site, a demolition site or compound.
Negligible	No discernable change in environmental condition, as a result of the development.	<ul style="list-style-type: none"> Variation in predicted concentration of less than 1% of the air quality criterion. Little or no cause for nuisance complaints to be made. Area affected is 100m from any minor construction activity or 1,000m from any major construction activity.

NOTE: (1) An impacts magnitude can be either positive or negative, except for negligible.
(2) If the assessor is certain that a receptor or attribute of a feature will suffer no impact whatsoever then the term 'No Impact' can be used in the place of 'Negligible Impact'. However, it is not usually possible to determine 'No Impact' in many cases with 100% certainty so the term 'Negligible' should be used in these cases.

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

Sensitivity of Receptor

10.5 Receptors can demonstrate different sensitivities to changes in their environment. For the purpose of this assessment sensitivity is determined as Very High, High, Medium or Low as detailed in Table 10.2.

Table 10.2 Methodology for Assessing Sensitivity of Receptor: Air Quality

Sensitivity	Criteria
Very High	<ul style="list-style-type: none"> Absolute pollutant concentration above the air quality criterion <i>without</i> the scheme. Receptors of very high sensitivity to dust and odour, such as: hospitals and clinics, retirement homes, painting and furnishing, hi-tech industries, car showrooms and food processing.
High	<ul style="list-style-type: none"> Absolute pollutant concentration 90-100% of the air quality criterion without the scheme. Receptors of high sensitivity to dust and odour, such as: schools, residential areas, food retailers, glasshouses and nurseries, horticultural land and offices.

Sensitivity	Criteria
Medium	<ul style="list-style-type: none"> • Absolute pollutant concentration 75-90% of the air quality criterion without the scheme. • Receptors of medium sensitivity to dust and odour, such as: farms, outdoor storage, light and heavy industry.
Low	<ul style="list-style-type: none"> • Absolute pollutant concentration less than 75% of the air quality criterion without the scheme. • All other dust and odour sensitive receptors not identified above.

Assessment of Impact Significance

10.6 Table 10.3 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.

Table 10.3 Impact Significance Matrix

Sensitivity of Receptor	Magnitude of Impact			
	Substantial	Moderate	Slight	Negligible
Very High	Major	Intermediate	Minor	Neutral
High	Intermediate	Intermediate	Minor	Neutral
Medium	Minor	Minor	Neutral	Neutral
Low	Minor	Neutral	Neutral	Neutral

10.7 For the purposes of this EIA, an impact identified as being of intermediate significance or greater is considered to be significant.

Planning Policy Context

10.8 The following legislation and policy guidance has been identified as applicable to the consideration of impacts in relation to air quality.

Legislation

European Legislation

10.9 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. The consolidated Directives include:

- Directive 99/30/EC – the First Air Quality "Daughter" Directive – sets ambient air limit values for nitrogen dioxide (NO₂) and oxides of nitrogen (NO_x), sulphur dioxide (SO₂), lead (Pb) and particulate matter (PM).
- Directive 2000/69/EC – the Second Air Quality "Daughter" Directive – sets ambient air limit values for benzene (C₆H₆) and carbon monoxide (CO).
- Directive 2002/3/EC – the Third Air Quality "Daughter" Directive – seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone (O₃) in ambient air.

10.10 The fourth daughter Directive was not included within the consolidation and is described as:

- Directive 2004/107/EC – sets health-based limits on polycyclic aromatic hydrocarbons (PAHs), cadmium (Cd), arsenic (As), nickel (Ni) and mercury (Hg), for which there is a requirement to reduce exposure to as low as reasonably achievable.

UK Legislation:

10.11 The Air Quality Standards Regulations (2007) seek to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directive, First, Second and Third Daughter Directives and also transpose the Fourth Daughter Directive within the UK. The Air Quality Limit Values are transposed into the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives. SI 2007 No. 64 Regulation 14 extends powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to Local Authorities (LAs) for the implementation of these Directives.

10.12 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 effects of air pollution.

10.13 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.

- 10.14 The AQOs for pollutants included within the Air Quality Strategy are presented in Appendix 10.1 along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines.

Local Authority Pollution Control:

- 10.15 Local Authorities, including Barnsley Metropolitan Borough Council (BMBC), 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.

- 10.16 The following subsections provide details of BMBC's air quality obligations applicable to this assessment.

Local Air Quality Management:

- 10.17 Under Section 82 of the Environment Act (1995) (Part IV) LAs are required to periodically review and assess air quality within their area of jurisdiction under the system of LAQM. This Review and Assessment of air quality involves assessing present and likely future air quality against AQO levels. If it is predicted that levels at the façade of buildings where members of the public are regularly present (normally residential properties) are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs. The results of BMBC's Review and Assessment of air quality in the Council's area of jurisdiction are reviewed within this Air Quality EIA.

Dust Management:

- 10.18 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2010) is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

'any dust, steam, smell or other effluvia arising on industrial trade or business premises and being prejudicial to health or a nuisance.'

10.19 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to Best Practice Measures (BPM).

Odour Management:

10.20 There are neither specific European nor UK regulatory standards for the assessment of the impact of odour. However, it may be reasonably argued that complaints are likely to occur when odours become detectable and recognisable. The longer detection persists for an individual, the greater the level of complaints may be expected, particularly if the odours are unpleasant or noxious.

10.21 As with dust, in the UK the main requirements with respect to odour control from industrial or trade premises not authorised under the Environmental Permitting (England and Wales) Regulations (2010) is that provided in section 79 of Part III of the Environmental Protection Act (1990).

Planning and Policy Guidance

National Policy

Planning Policy Statement 1: Delivering Sustainable Development (2005).

10.22 Planning Policy Statement 1 (PPS1) sets out the Government's overarching planning policies on the delivery of sustainable development through the planning system.

Planning Policy Statement 23: Planning and Pollution Control (2004).

10.23 Planning Policy Statement 23 (PPS23) emphasises the need for development to contribute to the principles of sustainability. Amongst the matters for inclusion in taking decisions on planning applications are the potential effects of new deployments in or close to Air Quality Management Areas (AQMAs) and areas of poor air quality. The need to consider local air quality reviews and other assessments is also referenced. The key elements of PPS 23 are contained in three paragraphs of Appendix 1G, as follows:

“1G.1 Any air quality consideration that relates to land use and its development is capable of being a material planning consideration. Wherever a proposed development is likely to have significant air quality impacts, close co-operation between Local Planning Authorities (LPAs) and those with responsibilities for air quality and pollution control will be essential. The impact on ambient air quality is likely to be particularly important:

- **Where the development is proposed inside, or adjacent to, an air quality management area (AQMA) designated under Part IV of the Environment Act 1995;**
- **Where the development could in itself result in the designation of an AQMA; and,**
- **Where to grant planning permission would conflict with, or render unworkable, elements of a LA's air quality action plan.**

1G.2 It is not the case that all planning applications for developments inside or adjacent to AQMAs should be refused if the developments would result in a deterioration of local air quality. Such an approach could sterilise development, particularly where authorities have designated their entire areas as AQMAs. LPAs, transport authorities and pollution control authorities should work together to ensure development has a beneficial impact on the environment, for example by exploring the possibility of securing mitigation measures that would allow the proposal to proceed. Road transport is recognised as a significant contributor to poor local air quality, particularly in urban areas. LPAs can play a key role by ensuring that developments reduce the need to travel and encouraging more sustainable travel choices.

1G.3 All such applications, should be supported by such information as is necessary to allow a full consideration of the impact of the proposal on the air quality of the area. It may be appropriate in some circumstances for the developer to fund mitigation measures elsewhere inside the AQMA to offset any increase in local pollutant emissions as a consequence of the proposed development. These measures could be secured through Section 106 Agreements. Paragraph 1.50 of this Annex gives advice on the use of planning obligations.”

Planning Policy Guidance Note 13: Transport (2001).

- 10.24 Planning Policy Guidance Note 13 (PPG13): Transport emphasises the need to achieve sustainable forms of development, with particular reference to high density developments on brownfield sites in urban areas. Such developments, especially those located in city and town centres, will reduce the need to travel by car, thereby contributing to reduced vehicle emissions.

Minerals Policy Statement 2: Controlling and Mitigating the Environmental Effects of Mineral Extraction in England – Annex 1: Dust (2005).

- 10.25 Consideration has also been made to the requirements of Minerals Policy Statement 2 (MPS2): Controlling and mitigating the environmental effects of mineral extraction in England - Annex 1: Dust. This is a statement of the policy considerations the Government expects mineral planning authorities in England to have in regard when considering policies and planning decisions in relation to dust from mineral workings and associated operations. It is acknowledged that the proposed development does not involve active mineral workings. However, the guidance provides a good overview of planning considerations in regard to the potential for dust nuisance.

Regional Policy

- 10.26 Regional Planning Bodies have the main responsibility for preparing Regional Spatial Strategies (RSS). On 6th July 2010, the Coalition Government revoked all regional strategies under section 79(6) of the Local Democracy, Economic Development and Construction Act (2009). This action was challenged in the High Court and the decision concluded that Section 79 powers could not be used to revoke all Regional Strategies in their entirety. Therefore, for the time being RSS policy remains part of the development plan. It should be noted that the Government's Chief Planner has confirmed to all local authorities that the government's intention is to abolish the RSS in the forthcoming Localism Bill.
- 10.27 The adopted Yorkshire and Humber Regional Spatial Strategy (2008) sets out the region's spatial planning policy framework. It covers the period up to 2026, influencing local authority plans and policies in order to deliver on national planning policy.
- 10.28 The considerations and policies relating to air pollution and transport that are relevant to the proposed development within the Regional Spatial Strategy are outlined below:

“Policy T1 – Personal Traffic Reduction and Modal Shift: The Region will aim to reduce travel demand, traffic growth and congestion, shift to modes with lower environmental impacts, and improve journey time reliability. This will require a range of complementary measures from land-use and transport policies through to measures that discourage inappropriate car use, encourage the use of lower-emission vehicles, reduce energy consumption, secure air quality improvement, improve public transport and accessibility by non-car modes, and promote the highest standards of safety and personal security.”

Local Policy

10.29 The Barnsley Unitary Development Plan (UDP) and was formally adopted by Barnsley Metropolitan Borough Council (BMBC) in 2000 to provide a statutory framework to guide development and enhance the environment of the Borough. The UDP and subsequent amendments is currently in the process of being replaced by the Local Development Framework (LDF) in line with the Planning and Compulsory Purchases Act (2004), a staged process to re-evaluate the policies and considerations detailed within the UDP. The Core Strategy Development Plan Document was the subject of an Examination in Public in March 2011 and, as such, is at an advanced stage of preparation.

10.30 The policies contained within the UDP relevant to this Air Quality EIA are as follows:

“Policy ED4 – Proposals for economic development adjoining or close to housing will be assessed with particular regard to the likely impact on residential amenity in terms of:

- **Air pollution including smell, fumes, smoke, soot, ash, dust or grit;**
- **Noise from operations on, or traffic entering or leaving the site; and,**
- **Visually intrusive buildings, plant, fencing, lighting or outside storage.”**

“Policy ES1 – The council will refuse proposals for development which are likely to result in harm to the environment through excessive levels of pollution arising either within the site to be developed or occasioned elsewhere by the proposed development. The council will in particular resist development which is likely to result in housing, schools, hospitals or other sensitive land uses being subjected to excessive levels of air, noise or other pollution. Where

development is permitted the council will seek to ensure that resulting pollution is avoided or minimised.”

Existing Situation

10.31 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.

Dust and Odour

10.32 A desk study was undertaken in order to identify any existing sources of dust and odour in the vicinity of the site. No major sources of dust and odour which may give rise to cumulative dust impacts during the construction phase were identified.

Air Quality

Air Quality Review and Assessment

10.33 As required under Section 82 of the Environment Act (1995) (Part IV), BMBC have conducted an ongoing exercise to assess air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the relevant AQO. BMBC have therefore declared 5No. AQMAs described as:

- AQMA 1 – M1;
- AQMA 2a – Dodworth Road;
- AQMA 2b – Barnsley Road and Mitchelson Avenue;
- AQMA 3 – Wakefield Road and Burton Road;
- AQMA 4 – Harborough Hill Road; and,
- AQMA 5 – Burton Road.

10.34 AQMA order No.5 is situated approximately 0.2km to the east of the proposed development site and AQMA order No.2 is situated approximately 0.4km to the west. It is therefore considered that the proposed development would impact on these declared AQMAs. Reference should be made to Figure 10.1 for a graphical representation of the BMBC AQMAs in relations to the development site.

10.35 All other pollutants contained within the BMBC's area of jurisdiction were found to be below the relevant AQOs and it has not been necessary to declare any further AQMAs.

Continuous Air Quality Monitoring

10.36 The UK Automatic Urban and Rural Network (AURN) is a country-wide network of air quality monitoring stations operated on behalf of the Department for Environment, Food and Rural Affairs (DEFRA). Monitoring data for AURN sites is available from the UK National Air Quality Archive.

10.37 The closest NO₂ AURN monitoring location to the proposed site is Barnsley Gawber (NGR: 432529, 407472), approximately 2.5km north-west of the proposed development. This monitoring station is classified as 'urban background' location (an urban location distanced from sources and broadly representative of city-wide background concentrations). Due to the proximity of the monitoring location and its 'urban background' classification, it is considered that similar pollutant concentrations would be observed at the proposed development site. A summary of the AURN monitoring data is provided in Table 10.4.

10.38 Any exceedences of the relevant AQO are displayed in **bold**.

Table 10.4 Barnsley Gawber AURN Monitoring Data

Year	Annual Mean NO₂ Concentration (µg.m⁻³)	Number of Hours >200µg.m⁻³	Data Capture (%)
2010	25.12	0	93.78
2009	18.88	0	93.40

10.39 BMBC operate a network of 5No. continuous air quality monitoring stations, of which all monitor NO₂ concentrations, as part of their commitment to LAQM (of which Barnsley Gawber and Barnsley 12 are part of the AURN network). The closest of these to the proposed development site is Barnsley A635 (NGR: 436298, 405691), located approximately 1.7km south-east and classified as a 'roadside' location (a site sampling within 1m of the kerb of a busy road and the back of a pavement, this will be within 5m of the kerbside).

10.40 Due to the site classification, it is not considered that similar pollutant concentrations will be experienced at the proposed development site. This site is also not located on any road which traffic data has been provided for therefore this data has not been considered further within the assessment.

Nitrogen Dioxide Diffusion Tube Monitoring

10.41 BMBC maintains a network of 101No. NO₂ diffusion tubes as part of their commitment to LAQM. These are located in areas that have been deemed to require further assessment of pollutant concentrations throughout the borough.

10.42 A summary of NO₂ monitoring results from the closest diffusions tube to the proposed site is contained in Table 10.5. Any exceedences of the relevant AQO are shown in **bold** text.

Table 10.5 Nitrogen Dioxide Diffusion Tube Monitoring Results

Monitoring Site	Site Classification	UK NGR (m)		Annual Mean NO ₂ Concentration (µg.m ⁻³)	
		X	Y	2008	2009
11 – Alhambra Roundabout	Roadside	434695	406110	55.3	51.7
92 – Pontefract Road/Clyde Street	Kerbside	434920	406277	38.8	35.8
93 – Pontefract Road/Queens Road	Roadside	434879	406413	41.8	32.6
94 – Slip Road/Harborough Hills Road	Kerbside	434876	406491	43.0	41.6
72 – Taylor Road	Roadside	434916	405930	42.9	42.5
71 – Doncaster Road/Oakwell Road	Roadside	435025	405947	46.3	45.6
99 – Mottram Street/Eldon Street	Roadside	434727	406753	37.1	36.9
95 – 49 Harborough Hill Road	Roadside	434933	406695	84.6	69.1
96 – James Street	Urban Background	434914	406746	34.1	30.4

10.43 As indicated in Table 10.5, the annual mean NO₂ concentrations exceeded the relevant AQO at a number of monitoring locations in 2008 and 2009.

10.44 The BMBC Progress Report 2010 recognises the exceedences of the NO₂ annual mean AQO and states that:

“[...] a detailed assessment is still required for locations along Sheffield Road in Birdwell and the Sheffield Road / Park Road / Cemetery Road junction in

Barnsley town centre, but may not be required for Wombwell Lane at Stairfoot and Doncaster Road. The detailed assessment is currently being undertaken and will however take account of the Wombwell Lane and Doncaster Road; the 2009 data will be used in order to help determine whether or not declaration of additional AQMAs along Wombwell Lane and Doncaster Road is required.”

Background Pollutant Mapping

- 10.45 Background pollutant concentration data on a 1km x 1km spatial resolution is provided by the UK National Air Quality Archive and is routinely used to support LAQM and Air Quality Assessments.
- 10.46 Mapped background concentrations were downloaded for the grid square covering the development site.

Table 10.6 Mapped Background Concentrations at Proposed Development Site

Pollutant	Predicted Background Concentration ($\mu\text{g.m}^{-3}$)			
	2009	2010	2011	2013
NO _x	53.57	49.67	47.63	43.56
NO ₂	30.48	28.88	27.96	26.13
PM ₁₀	16.97	16.45	16.18	15.66

- 10.47 Table 10.6 indicates that there are no background exceedences of the relevant AQOs in any year at the development site.

Sensitive Receptors

- 10.48 The term 'sensitive receptors' includes any persons, locations or systems that may be susceptible to changes in abiotic factors as a consequence of the development. The sensitivity of receptors will vary in accordance with the type of environmental impacts predicted, as detailed below.

Ecological Receptors

- 10.49 Potential air quality impacts associated with both the construction and operation of the proposed development have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The Conservation (Natural Habitats, & c.) Regulations (1994) and subsequent amendments require competent authorities to review planning applications

and consents that have the potential to impact on European designated sites (e.g. Special Areas of Conservation).

10.50 A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within 1,000m of the proposed development site. 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.

10.51 A search within 1,000m of the proposed development found no receptors of ecological sensitivity.

Dust Sensitive Receptors

10.52 A desk study was undertaken to identify any potential sensitive receptors to emissions of dust associated with the construction of the proposed development. MPS2 considers any receptors within 1,000m of any dust-generating operation to be potentially affected by that activity, in terms of a potential nuisance from dust emissions.

10.53 The dust-sensitive receptors identified within 1,000m of the proposed development site boundary are shown in Table 10.7. Where these sensitive receptors are referenced in the report text they are referred to as DR1 to DR17. The sensitivity of the receptors was defined using the methodology contained within, which is based upon sensitivities outlined within MSP2.

Table 10.7 Dust Sensitive Receptors Identified within 1,000m of Proposed Development

Site Boundary

Receptor		Sensitivity	Approximate Distance from Site Boundary and Compass Direction		UK NGR (m)	
			Distance (m)	Direction	X	Y
DR1	Galtee Nursing Home	Very High	530	SE	435206	405874
DR2	Kia Motors	Very High	670	SE	435458	406019
DR3	Lowerdale Autos	Very High	255	S	434900	405971
DR4	Low Cost Motor Company	Very High	445	SE	435126	405914
DR5	Harratts Peugeot	Very High	110	SE	434888	406159

Receptor		Sensitivity	Approximate Distance from Site Boundary and Compass Direction		UK NGR (m)	
			Distance (m)	Direction	X	Y
DR6	Hyundai Car Dealership	Very High	60	W	434880	406288
DR7	Holgate Sports College	High	960	W	433610	406087
DR8	Holy Road RC Primary School	High	900	W	433694	405983
DR9	Pipers Grove Primary School	High	205	NE	434957	406561
DR10	Doncaster Road Primary School	High	490	SE	435166	405902
DR11	Barnsley College	High	760	N	434318	407136
DR12	Barnsley College	High	345	N	434447	406741
DR13	University Campus	High	250	NW	434392	406596
DR14	Industrial Estate	Medium	985	W	435801	406333
DR15	Offices (BMBC)	Medium	200	NW	434381	406494
DR16	Barnsley Football Club	Low	495	W	435331	406309
DR17	Allotments	Low	275	NE	434955	406615

10.54 Reference should be made to Figure 10.2 for a graphical representation of the identified dust sensitive receptor locations.

10.55 The dust sensitive receptors identified in 10.7 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience dust impacts as a result of the proposed development that have not been individually identified above.

10.56 A graphical representation of dust buffer zones is also presented in Figure 10.2. This indicates all sensitive receptors within 1,000m of the proposed site boundary that may experience impacts as a result of dust generating activities.

Exhaust Emission Sensitive Receptors

10.57 The Design Manual for Roads and Bridges (DMRB) considers any receptor within 200m of a road source to be potentially affected by that operation. The AQOs only apply at locations where the public may be exposed to pollution for a sufficient period for there to be any measurable health effect. The averaging period and AQO involved will determine which

locations are considered to be sensitive receptors. For NO₂ and PM₁₀ annual mean AQOs, LAQM.TG(09) considers typical locations for sensitive receptors to include:

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

10.58 Receptors sensitive to road vehicle exhaust emissions are shown in Table 10.8. Reference should be made to Figure 10.3 for a graphical representation of receptor locations.

Table 10.8 Identified Road Vehicle Exhaust Emission Sensitive Receptors

Discrete Receptor		UK NGR (m)	
		X	Y
R1	Flat above Shop (Sheffield Road)	434798	406039
R2	Flat above Shop (Sheffield Road)	434960	405719
R3	Residential Property on Sheffield Road	434850	405973
R4	Residential Property on Sheffield Road	434965	405643
R5	Residential Property on Sheffield Road	434985	405651
R6	Residential Property on Sheffield Road	434989	405550
R7	Residential Property on Sheffield Road	435005	405589
R8	Residential Propert on Cemetery Road	434887	405709
R9	Residential Propert on Cemetery Road	434778	405686
R10	Residential Propert on Cemetery Road	435054	405706
R11	Residential Property on Cemetery Road	435075	405688
R12	Residential Property on Doncaster Road	435047	405952
R13	Doncaster Primary School	435173	405885
R14	Pipers Grove Primary School	434949	406569
R15	Residential on Harborough Hill Road	434891	406521
R16	Residential on Harborough Hill Road	434909	406599
R17	Residential on Harborough Hill Road	434883	406374
R18	Residential on Harborough Hill Road	434948	406727
R19	Residential on Pontefract Road	434918	406308
R20	Galtee Nursing Home	435210	405865

10.59 The sensitive receptors identified in Table 10.8 represent worst-case locations and have been chosen as the closest residences to each road which may be affected by the traffic associated with the proposed development. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience air quality impacts as a result of the proposed development that have not been individually identified above.

10.60 Sensitivity of receptor has been based on the criteria presented within Table 10.2.

Odour Sensitive Receptors

10.61 For the purpose of this assessment the receptors defined in Table 10.8 have also been considered sensitive to odour emissions, in terms of nuisance, during the operational phase of the proposed development.

Impact of Development

Dust - Construction Impacts

10.62 Demolition and construction at the proposed site is to be undertaken during 2No. 18-month phases, with the major demolition activities will occur during the initial phase of the development.

10.63 It is reasonable to assume that on-site activities associated with both demolition and construction will include:

- Demolition works;
- Site preparation;
- Material import and export;
- Temporary stockpiling of materials;
- Construction of new on-site facilities; and,
- Associated vehicle movements.

10.64 Potential air quality impacts associated with these activities have been identified as:

- Generation of dust emissions on-site as a result of windblown debris from demolition activities and construction materials;
- Generation of exhaust emissions from construction plant on site; and,
- Generation of exhaust emissions from construction phase road traffic, including Light Duty Vehicles (LDVs) carrying construction workers to and from the development site and Heavy Duty Vehicle (HDV) movements associated with the export and import of construction material.

10.65 During the construction phase the potential for dust emissions will be directly influenced by the nature of the activities taking place on-site. The most significant source of dust has been identified as being from the demolition works, along with wind blown debris and construction material. Vehicle movements will also be generated both on-site and on the local and regional road network which will have the potential to cause the re-suspension of dust due to vehicle-produced turbulence, especially in dry and windy meteorological conditions. Construction works are also likely to require stockpiling of materials on-site on a short-term basis, increasing the potential for the generation of fugitive dust emissions.

10.66 Temporary elevation in dust levels is considered to be inevitable as part of the proposed demolition and construction works, particularly where activities are undertaken during dry and/or windy meteorological conditions.

10.67 MPS2: Annex 1 specifies that if:

"the actual source of emission (e.g. the haul roads, crushers, stockpiles etc.) is within 1,000m of any residential property or other sensitive use, then a further assessment should examine the likely impacts and the weight they should be given in the decision making process. The research suggests that this can be assessed against two potential sources of information:

- *Site / community-monitored PM₁₀ data; and,*
- *Any available air quality monitoring network data."*

10.68 Reference has been made to available PM₁₀ data contained within the UK National Air Quality Archive, as detailed in Table 10.6, which is specified in MPS2: Annex 1 as an

acceptable source of data. This indicated that exceedences of the annual mean AQO for PM₁₀ were not predicted in the vicinity of the development site as a baseline condition.

10.69 The scale of potential impacts related to demolition and construction phase dust emissions is predicted on a qualitative basis. The Greater London Authorities (GLA) best practice guidance provides the following guidelines for site risk evaluation.

Table 10.9 GLA Site Evaluation

Site	GLA Description	WYG Site Classification
Low Risk Sites	<ul style="list-style-type: none"> • Development of up to 1,000m² of land; • Development of 1 property and up to a maximum of 10; and, • Potential for emissions and dust to have an infrequent impact on sensitive receptors. 	Minor Active Site
Medium Risk Sites	<ul style="list-style-type: none"> • Development between 1,000m² and 15,000m² of land; • Development of between 10 and 150 properties; and, • Potential for emissions and dust to have an intermittent or likely impact on sensitive receptors. 	Discretion used: < 7,500m ² = Minor Active Site; or, > 7,500m ² Major Active Site
High Risk Sites	<ul style="list-style-type: none"> • Development of over 15,000m² of land; • Development of over 150 properties; • Major Development referred to the Mayor and/or the London Development Agency; • Major development defined by a London borough; and, • Potential for emissions and dust to have a significant impact on sensitive receptors. 	Major Active Site

10.70 Due to the nature of the site (containing demolition and construction works), dust emissions are considered to be frequent. However, with the implementation of a Dust Action Plan (which will be submitted to the BMBC) it is considered that there will be an infrequent impact on receptors, therefore the site has been classified as a 'minor active site' for the purpose of this assessment.

10.71 An assessment of potential impacts related to dust generated during both phases has been undertaken based upon the distance from the site boundary. Reference should be made to Figure 10.2 for a graphical representation of the receptors and distance from the site

boundary. The predicted significance of effects as a result of the construction phase dust is presented in any significant impacts are displayed in **bold**.

Table 10.10 Dust Emissions Predicted Impacts and Effects

Feature / Nature of Impact	Sensitivity	Impact	Significance of Effect
Generation of dust by demolition and construction phase activities at dust sensitive receptor DR6.	Very High	Slight, adverse	Minor, adverse
Generation of dust by demolition and construction phase activities at dust sensitive receptors DR1 to DR5.	Very High	Negligible	Neutral
Generation of dust by demolition and construction phase activities at dust sensitive receptors DR7 to DR13.	High	Negligible	Neutral
Generation of dust by demolition and construction phase activities at dust sensitive receptors DR14 and DR15.	Medium	Negligible	Neutral
Generation of dust by demolition and construction phase activities at dust sensitive receptors DR16 and DR17.	Low	Negligible	Neutral
Generation of dust by construction phase activities at residential properties between 100m and 1,000m, towards the east, south and west of the site boundary.	High	Negligible	Neutral

10.72 All impacts are predicted in regard to the potential for dust nuisance complaints and surface soiling events due to deposition, as opposed to the risk of exceeding any AQOs.

10.73 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 throughout 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.

10.74 As the assessment of potential dust impacts has been undertaken qualitatively and in the absence of detailed construction information, confidence in these predictions is **low**.

10.75 It should be noted that all impacts have been assessed based on the distance between the site 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 considered to be robust.

- 10.76 It is considered that the use of suitable mitigation and best practice techniques, as outlined in at the end of this chapter, should reduce potential impacts from a development of this size and nature to an acceptable level especially when undertaking works in close proximity to sensitive receptors.

Generation of Exhaust Emissions by Construction Plant On-site

- 10.77 Exhaust emissions from wagons, plant and other demolition/construction vehicles involved with works on the proposed development site have the potential to generate emissions to air.
- 10.78 Detailed information on construction plant was not available for the purposes of this assessment. However, potential air quality impacts will depend on the location of plant in relation to sensitive receptors.
- 10.79 The potential impact of temporary demolition/construction plant exhaust emissions has been assessed as being **negligible** in magnitude to receptors of **low** sensitivity, as it is considered unlikely that concentrations of exhaust pollutants would increase by more than 1% of the relevant AQO. The unmitigated impact significance is therefore predicted to be **neutral**, in accordance with the stated assessment methodology.
- 10.80 All 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 throughout the construction phase, **short-term** because these will only arise during the construction phase, and **reversible** as conditions will return to baseline upon cessation of construction phase activities.
- 10.81 As the assessment of potential air quality impacts resulting from demolition and construction phase site plant has been undertaken in the absence of detailed information, confidence in this assessment is **low**. Although a **neutral** impact has been predicted, suitable embedded and proposed mitigation options previously mentioned and best practice

techniques, as outlined at the end of this chapter should reduce potential impacts from a development of this size and nature to an acceptable level.

Generation of Exhaust Emissions by Construction Phase Road Traffic

- 10.82 Road traffic exhaust emissions generated by wagons, vans, cars and other vehicles associated with the proposed development using the local and regional road network have the potential to cause increased concentrations of traffic-related pollutants, such as NO₂ and PM₁₀, in the vicinity of the development site.
- 10.83 Additional vehicle trips are anticipated to include LDVs carrying employees and visitors to and from the proposed development site and additional HDV movements associated with the import and export of material.
- 10.84 The DMRB states that further assessment of potential air quality impacts should be undertaken if the following criteria are met on any link affected by a proposed development:
- Increase in 24-hour Annual Average Daily Traffic (AADT) flow of more than 1,000No. vehicles; and/or,
 - Increase in 24-hour AADT HDV flow of more than 200No. vehicles.
- 10.85 Detailed information on traffic movements anticipated during demolition and construction works was unavailable for the completion of the Air Quality Assessment. However, it is not anticipated that the development would result in a change in 24-AADT flows in excess of the DMRB screening criteria, and therefore air quality impacts are not likely to be significant.
- 10.86 The distribution of traffic flows generated by the demolition/construction phase of the proposed development on the local and regional road network is difficult to predict as it will depend on the source and end locations of the required materials.
- 10.87 The potential impact of demolition/construction phase road vehicle exhaust emissions has been assessed as being **negligible** in magnitude to receptors of **low** sensitivity. The impact significance is considered to be **neutral**, in accordance with the stated assessment methodology.

- 10.88 All 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 throughout the construction phase, **short-term** because these will only arise during the construction phase, and **reversible** as conditions will return to baseline upon cessation of construction phase activities.
- 10.89 As the assessment of potential impacts resulting from construction traffic has been undertaken using the DMRB assessment methodology, confidence in this prediction is **high**. Although a **neutral** impact has been predicted, suitable mitigation options are included at the end of this chapter in order to further control potential impacts.

Air Quality- Operational Impacts

- 10.90 Air quality impacts associated with the operational phase of the proposed development have been identified as:
- Road vehicle exhaust emissions associated with vehicles travelling to and from the proposed development and using the new road network; and,
 - Odour emissions arising from the operation of commercial kitchens and the meat and fish market.

Road Vehicle Exhaust Emissions

- 10.91 Additional vehicle movements associated with the proposed development will generate additional exhaust emissions, such as NO₂ and PM₁₀, on the local and regional road networks. In order to quantify potential impacts of these emissions in the vicinity of the site, a detailed dispersion modelling assessment has been undertaken using the ADMS-Roads software package. This model is routinely used in the UK for environmental assessment work.
- 10.92 The impact of road vehicle exhaust emissions has been undertaken assuming a proposed development opening year of 2013.
- 10.93 The development opening year was considered with appropriate 'do-minimum' and 'do-something' scenarios. The 'do-minimum' scenario included predicted traffic data should the development not occur, including committed development traffic within the locale

surrounding the proposed development. The 'do-something' scenario included predicted traffic data should the development be completed.

10.94 Reference should be made to the following appendices of this Air Quality Assessment:

- Figures;
- Appendix 10.2 Detailed Modelling – Method Statement;
- Appendix 10.3 Verification;
- Appendix 10.4 Detailed Modelling of Operational Phase Emissions - Contour Plots; and,
- Appendix 10.5 Detailed Modelling of Operational Phase Emissions - Detailed Results Tables.

Table 10.11 Summary of Modelling Inputs

Parameter	Description	Input
Surface Roughness	Surface roughness of the modelling domain as a function of land use	0.5
Latitude	Model location	55.6
Monin-Obukhov Length	The measure of stability based upon the urbanisation of the modelling domain	30m
Chemistry	A facility within ADMS-Roads to calculate the chemical reactions in the atmosphere between Nitric Oxide (NO), NO ₂ , Ozone (O ₃) and volatile organic compounds (VOCs)	None
Road Source Emissions	Source of the emission factors used	EFT v 4.2.2
Emission Year	Modelling year used to factor the traffic emissions	2009 for the base year model verification 2013 for the development opening year
Road Type	Road type within the emission database	Urban
Elevation of Road	Height of the road link above ground level	0m
Road Width	Width of the road link	Road width used depended on data obtained from OS map data for the specific road link

Parameter	Description	Input
Canyon Height	The height of buildings either side of the road creating a "street canyon" which impacts on turbulent flow patterns. If no canyons this should be set to 0	0
Road Speed	Road speed in km.h ⁻¹	Assumed to be the National speed limit for the modelling road link. Slow-down phases were modelled for the 50m approach to each junction at a speed of 20km.h ⁻¹ as per LAQM.TG(09) guidance.
Time Varied Emissions	Daily, weekly or monthly variations in emissions applied to road sources	None
Meteorology	Representative hourly sequential meteorological data	Robin Hood Airport 2009
Background	Background pollutant concentration considered during the modelling	0
Output	Output as gridded or specified points	Both
Gridded Output Spacing	Spacing of the output grid	Resolution at 16.25m, in addition to intelligent grid option
Gridded Output	Extents of the modelling domain	X: 434520, 435170 Y: 405430, 406730
Topography	Complex terrain data included within the model in order to account for turbulence and plume spread effects of topography	None
Pollutant Output	Pollutants modelled and averaging time	NO _x (then converted to NO ₂) and PM ₁₀ annual mean

Nitrogen Dioxide

- 10.95 Predicted annual mean ground level NO₂ concentrations for each modelling scenario were assessed against the AQO of 40µg.m⁻³. Reference should be made to the isopleth plots contained in Appendix 10.4 for a graphic representation of predicted annual mean ground level NO₂ concentrations.
- 10.96 The results of the model predictions at each discrete receptor identified in Table 10.12 (R1 to R20) are summarised in Table 10.12.
- 10.97 Reference should be made to the detailed results tables contained in Appendix 10.5 for a comprehensive report of predicted annual mean ground level NO₂ impacts. Exceedences of the relevant AQOs are shown in **bold** text, where relevant.

Table 10.12 Summary of Predicted Annual Mean NO₂ Concentrations

Receptor	Annual Mean NO ₂ Concentrations (µg.m ⁻³)		Marginal Change (µg.m ⁻³)
	'Do-minimum'	'Do-something'	
R1	39.54	39.78	+0.24
R2	29.03	29.15	+0.12
R3	36.61	36.82	+0.21
R4	24.95	25.02	+0.07
R5	35.01	35.14	+0.13
R6	18.94	18.97	+0.03
R7	29.80	29.90	+0.10
R8	20.13	20.15	+0.02
R9	18.67	18.68	+0.01
R10	25.56	25.62	+0.06
R11	20.62	20.66	+0.04
R12	30.46	30.63	+0.17
R13	26.30	26.43	+0.13
R14	18.81	18.84	+0.03
R15	25.58	25.63	+0.05
R16	28.22	28.27	+0.05
R17	32.31	32.46	+0.15
R18	28.21	28.24	+0.03
R19	31.00	31.21	+0.21
R20	27.44	27.57	+0.13

NOTE: All concentrations presented include a background annual mean NO₂ concentration of 13.89.m⁻³

10.98 As shown in Table 10.12, there are not predicted to be exceedences of the NO₂ annual mean AQO at any identified receptor.

10.99 Predicted impacts on annual mean NO₂ concentrations are summarised in Table 10.13. Reference should be made to Appendix 10.5 for further details of modelling predictions at each receptor location.

Table 10.13 Summary of Predicted Operational Phase Annual Mean NO₂ Impacts

Receptor	Sensitivity	Magnitude of Impact	Impact Significance	Nature of Impact
R1	High	Negligible	Neutral	-
R2	Low	Negligible	Neutral	-
R3	High	Negligible	Neutral	-
R4	Low	Negligible	Neutral	-

Receptor	Sensitivity	Magnitude of Impact	Impact Significance	Nature of Impact
R5	Medium	Negligible	Neutral	-
R6	Low	Negligible	Neutral	-
R7	Low	Negligible	Neutral	-
R8	Low	Negligible	Neutral	-
R9	Low	Negligible	Neutral	-
R10	Low	Negligible	Neutral	-
R11	Low	Negligible	Neutral	-
R12	Medium	Negligible	Neutral	-
R13	Low	Negligible	Neutral	-
R14	Low	Negligible	Neutral	-
R15	Low	Negligible	Neutral	-
R16	Low	Negligible	Neutral	-
R17	Medium	Negligible	Neutral	-
R18	Low	Negligible	Neutral	-
R19	Medium	Negligible	Neutral	-
R20	Low	Negligible	Neutral	-

10.100 All impacts are considered to be **direct, permanent, long-term** and **irreversible** in nature. The impacts are determined to be **direct** as they occur as a result of vehicles travelling to and from the proposed development, **permanent** as they will occur throughout the operational phase, **long-term** because these occur during the entire operational phase, and **irreversible** as conditions will not return to baseline conditions until cessation of the development.

10.101 Confidence in these predictions is **high** given that a detailed dispersion modelling assessment has been undertaken using traffic data provided to WYG by MVA, the transport consultants for the proposed development.

Particulate Matter

10.102 Predicted annual mean ground level PM₁₀ concentrations for each modelling scenario were assessed against the AQO of 40µg.m⁻³. Reference should be made to the isopleth plots contained in Appendix 10.4 for a graphic representation of the predicted annual mean ground level PM₁₀ concentrations.

10.103 The results of the model predictions at each discrete receptor identified in Table 10.13 (R1 to R20) are summarised in Table 10.14.

10.104 Reference should be made to the detailed results tables contained in Appendix 10.5 for a comprehensive report of the predicted annual mean ground level PM₁₀ impacts. Exceedences of the relevant AQOs are shown in **bold** text, where relevant.

Table 10.14 Summary of Predicted Annual Mean PM₁₀ Concentrations

Receptor	Annual Mean PM ₁₀ Concentrations (µg.m ⁻³)		Marginal Change (µg.m ⁻³)
	'Do-minimum'	'Do-something'	
R1	19.02	19.04	+0.02
R2	16.56	16.59	+0.04
R3	18.40	18.42	+0.02
R4	15.91	15.93	+0.02
R5	17.67	17.72	+0.04
R6	14.94	14.95	+0.01
R7	17.10	17.14	+0.04
R8	15.15	15.16	+0.00
R9	14.90	14.90	+0.00
R10	16.12	16.12	+0.01
R11	15.20	15.21	+0.01
R12	16.96	16.99	+0.03
R13	16.17	16.20	+0.02
R14	14.91	14.92	+0.00
R15	16.23	16.24	+0.01
R16	16.79	16.79	+0.00
R17	17.27	17.29	+0.02
R18	16.80	16.80	+0.00
R19	16.95	16.98	+0.04
R20	16.38	16.41	+0.03

NOTE: All concentrations presented include a background annual mean PM₁₀ concentration of 14.03µg.m⁻³

10.105 As shown in Table 10.15, there are no predicted exceedences of the PM₁₀ annual mean AQO at any discrete receptor location.

10.106 Predicted impacts on annual mean PM₁₀ concentrations are summarised in Table 10.15. Reference should be made to Appendix 10.5 for further details of modelling predictions at each receptor location.

Table 10.15 Summary of Predicted Operational Phase Annual Mean PM₁₀ Impacts

Receptor	Sensitivity	Magnitude of Impact	Impact Significance	Nature of Impact
R1	Low	Negligible	Neutral	-
R2	Low	Negligible	Neutral	-
R3	Low	Negligible	Neutral	-
R4	Low	Negligible	Neutral	-
R5	Low	Negligible	Neutral	-
R6	Low	Negligible	Neutral	-
R7	Low	Negligible	Neutral	-
R8	Low	Negligible	Neutral	-
R9	Low	Negligible	Neutral	-
R10	Low	Negligible	Neutral	-
R11	Low	Negligible	Neutral	-
R12	Low	Negligible	Neutral	-
R13	Low	Negligible	Neutral	-
R14	Low	Negligible	Neutral	-
R15	Low	Negligible	Neutral	-
R16	Low	Negligible	Neutral	-
R17	Low	Negligible	Neutral	-
R18	Low	Negligible	Neutral	-
R19	Low	Negligible	Neutral	-
R20	Low	Negligible	Neutral	-

10.107 All impacts are considered to be **direct, permanent, long-term** and **irreversible** in nature. The impacts are determined to be **direct** as they occur as a result of vehicles travelling to and from the proposed development, **permanent** as they will occur throughout the operational phase, **long-term** because these occur during the entire operational phase, and **irreversible** as conditions will not return to baseline conditions until cessation of the development.

10.108 Confidence in these predictions is high given that a detailed dispersion modelling assessment has been undertaken using traffic data provided by MVA, the transport consultants for the proposed development.

Odour Emissions

10.109 The proposed development includes provision for a meat and fish market, and commercial kitchen each which have the potential to cause odour nuisance at sensitive receptors. The development has designed with extracts to atmosphere above ridge height, where possible, which will aid the dispersion of any odorous emissions. Where extracts above the ridge

height are not possible, vents have been designed to extract away from potentially sensitive locations, i.e. along the railway line. It is considered that these design features will adequately disperse odorous emissions minimising the impact at sensitive locations.

10.110 The potential impact of operational phase odorous emissions has been assessed as being **negligible** in magnitude to receptors of **very high** to **low** sensitivity. The impact significance is considered to be **neutral**, in accordance with the stated assessment methodology.

10.111 All impacts are considered to be **direct, permanent, short-term** and **irreversible** in nature. The impacts are determined to be **direct** as they occur as a result of activities associated with the development, **permanent** as they will potentially occur throughout the operational phase, **short-term** because these will only arise during the odorous activities, and **irreversible** as conditions will not return to baseline conditions until cessation of the development.

10.112 As the assessment of potential impacts resulting from operational phase odour emissions has been undertaken using qualitatively, confidence in this prediction is **low**. Although a **neutral** impact has been predicted, suitable mitigation options are included at the end of this chapter in order to further control potential impacts.

Mitigation Measures

Dust - Construction Phase Mitigation

10.113 Along with the Dust Action Plan that will be submitted to the Local Authority, a selection of suitable mitigation measures have been provided for the construction and demolition phases. These should be considered when completing activities deemed to be of high dust generating potential, such as ground preparation, and also when undertaking works in close proximity to the north-eastern site boundary due to the residential properties bordering this location.

10.114 Additional advice regarding best practice measures are provided in Building Research Establishment (BRE) Pollution Control Guides, specifically:

BRE (2003) Controlling Particles, Vapour and Noise Pollution from Construction Sites

- Part 1: Pre-project planning and effective management;
- Part 2: Site preparation, demolition, earthworks and landscaping;
- Part 3: Haulage routes, vehicles and plant;
- Part 4: Materials handling, storage, stockpiles, spillage and disposal; and,
- Part 5: Fabrication processes and internal and external finishes.

10.115 The BRE Pollution Control Guide considers individual construction processes, activities that generate particles, methods of controlling emissions and management and monitoring measures. Through pre-project planning and management, dust emissions from the construction phase should be controlled in an effective manner. In order to control potential impacts, the following options may be employed where practicable:

- In order to prevent dust nuisance to adjoining occupiers, particularly during dry weather, there should be adequate screening and damping down during all excavation, clearance and other site preparations (including storage of construction materials);
- Vehicles should be sheeted to prevent loss of materials off-site;
- Storage locations for all materials that create dust, including soil, must be located away from the site boundary, particularly adjacent to residential properties, except where impractical, aggregated where possible to avoid the creation of many stockpiles, adequately screened to prevent wind loss and damped down where practical when being handled;
- Drop heights should be minimised and chutes should be used where possible;
- All site vehicles should have vertical exhausts to limit surface dust re-suspension;
- Exposed soils should be seeded as soon as possible following construction and should be maintained damp until the vegetation prevents wind erosion;
- Waste materials should not be burnt on-site; and,
- Avoid prolonged storage of materials on-site prior to use and/or disposal.

10.116 A Dust Action Plan will be submitted and agreed with the Local Authority. It is considered that this will effectively prevent and curtail the potential for dust emissions during the demolition and construction phase of the development, sustaining the magnitude of impact to a suitable level.

Generation of Exhaust Emissions by Construction Plant On-site

10.117 The potential for air quality impacts from exhaust emissions from construction and demolition plant on-site will depend significantly on the location of plant in relation to local receptors and also the quantity of atmospheric emissions from each plant item. Although a **neutral** air quality impact was predicted, it is considered that any further reduction in exhaust emissions would benefit the overall pollution burden in the vicinity of the site and should therefore be considered if possible.

10.118 In order to control potential impacts, the following options may be employed where practicable:

- Mobile plant should be located away from residential areas and other sensitive receptors near to the proposed development site;
- Lorries and plant with diesel engines on or off-site should be well maintained in order to reduce emissions of visible smoke;
- Engines should not be left idling unnecessarily, and plant and vehicles must not be parked in a position that could give rise to nuisance from exhaust fumes;
- Site machinery and vehicles should use low-emission fuels; and,
- Use of site vehicles and plant with low exhaust emissions (e.g. with particle traps) and emission controls such as catalysts or diesel particle filters.

Generation of Exhaust Emissions from Construction Phase Road Traffic

10.119 Potential impacts associated with construction traffic exhaust emissions will depend on the amount of vehicle trips generated and also the rate of emissions per trip i.e. a trip during uncongested periods would produce less emissions than one during stop-start conditions. Although a **neutral** air quality impact was predicted, it is considered that any further reduction in exhaust emissions would benefit the overall pollution burden in the vicinity of the site and should be considered if possible.

10.120 In order to control potential impacts, the following options should be employed where practicable:

- Materials should be locally sourced as far as is possible;
- Contractors should be locally sourced as far as is possible; and,
- Promotion of 'just-in-time' deliveries outside of peak hours.

10.121 A suitable Site Waste Management Plan should also be implemented in order to reduce the quantity of waste produced during the construction phase. This will reduce the number of vehicle trips associated with the removal of waste off-site and may also promote the re-use and recycling of materials, which would reduce the overall environmental burden of the site.

Air Quality - Operational Phase Mitigation

10.122 A selection of suitable mitigation measures for the operational phase is provided below.

Emissions Associated with Operational Phase Road Vehicle Exhaust Emissions

10.123 An assessment of exhaust emissions associated with the operation of the proposed store determined a **neutral** impact. Exhaust fume and emissions from operational phase traffic have the potential to cause an adverse impact on local air quality. An aim for the operational phase should therefore be to reduce vehicle trips to and from the site. There are a number of design practices that may be employed in order to achieve the reduction in vehicle trips. The following mitigation measures should be installed as part of the scheme:

- Green travel plan for employees; and,
- Public transport information to be displayed around the development.

10.124 Implementing of the above traffic management measures may result in fewer vehicle trips and, therefore, fewer occasions of network capacity exceedences. This is likely to result in reductions of the mean roadside concentrations of traffic-related pollutant concentrations.

10.125 The promotion of deliveries outside peak hours both to and from the development site would aid in reducing congestion on the local and regional road networks and reduce the

potential for network capacity exceedences. This would increase free flowing traffic and hence reduce exhaust emissions from stationary vehicles.

10.126 The following further mitigation measures are provided but should not be regarded as an exhaustive list:

- Minimise reliance upon motor vehicle use;
- Promote alternative transport options;
- Inclusion of integrated cycle paths into surrounding environments;
- Inclusion of pedestrian walkways into surrounding environments; and,
- Promotion of public transport provisions.

Operational Phase Odour Emissions

10.127 The potential for odour impacts will be significantly controlled by the LEV system specifications and associated emission point locations.

10.128 The objective of the LEV systems should be to reduce the potential for statutory odour nuisance during the operational phase of the proposed development. In order to achieve this objective the LEV system should demonstrate an adequate level of:

- Odour control; and,
- Dispersion of odour emissions from the stack.

10.129 The operational performance of the LEV system will represent a balance of the above factors.

10.130 The height and velocity of the final discharge to air from the kitchen ventilation system will greatly influence the potential for statutory odour nuisance to occur. Generally, the greater the discharge exit height above roof level, the greater the dispersion and dilution of odours.

10.131 Should the location of the proposed LEV emission points be positioned away from sensitive receptors as detailed within the design then potential impacts will be reduced in the vicinity of the site.

10.132 The London Borough of Richmond upon Thames has recently published a guidance document that provides useful information in addition to the DEFRA guidance (DEFRA, 2005). In particular, the guidance suggests that the LEV system stacks should:

- Discharge the extracted air not less than 1m above the roof ridge of any building within 20m of the building housing the commercial kitchen;
- If point 1 above cannot be complied with for planning reasons, then the extracted air shall be discharged not less than 1m above the roof eaves or dormer window of the building housing the commercial kitchen. Additional odour control measures may be required;
- If points 1 or 2 cannot be complied with for planning reasons, then an exceptionally high level of odour control will be required.

10.133 Reference should be made to the DEFRA guidance document entitled 'Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems' (DEFRA, 2005) for further information on odour abatement and for a detailed review of common types of kitchen ventilation systems designed for the minimisation of food preparation odours.

10.134 Appropriate odour abatement should also be installed to reduce the potential for odour nuisance during the operational phase of the proposed development, this includes provision of suitable cleaning methods and good housekeeping for the markets.

10.135 The following further mitigation measures are provided but should not be regarded as an exhaustive list:

- Low to medium level control may include:
 - Fine filtration or electrostatic precipitation (ESP) followed by carbon filtration (carbon filters rated with a 0.1 second residence time).
 - Fine filtration followed by an odour counteracting/neutralising system to achieve the same level of control as indicated above.
- High level odour control may include:
 - Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.2-0.4 second residence time).

- Fine filtration or ESP followed by an ultraviolet (UV) ozone system to achieve the same level of control as indicated above.
- Very high level odour control may include:
 - Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.4-0.8 second residence time).
 - Fine filtration or ESP followed by carbon filtration and by an odour counteracting/neutralising system to achieve the same level of control as indicated above.
 - Fine filtration or ESP followed by a UV ozone system to achieve the same level of control as indicated above.
 - Fine filtration or ESP followed by wet scrubbing to achieve the same level of control as indicated above. Maintenance must be carried out to ensure these performance levels are always achieved.

Monitoring Programme

10.136 There are no dust, odour or air quality monitoring programmes associated with this development

Alternative Scenarios

10.137 No alternative scenarios have been considered.

Robustness of Analysis

10.138 The assessment of construction phase impacts has been based on distance between the site boundary and the identified receptor, as discussed it is unlikely that all construction phase activities will take place and the development boundary therefore the assessment is considered to provide a robust assessment.

10.139 The traffic data has been provided by the traffic consultants including any consented developments, where necessary, any errors in the traffic data provided will therefore also be present in the Air Quality Assessment.

Summary and Conclusions

- 10.140 An assessment was made of potential air quality impacts associated with the demolition and construction phase of the proposed development. These were considered to include the generation of dust from both activities and exhaust emissions by construction and demolition phase road traffic and plant on-site. It should be noted that the mitigation measures provided and the implementation of a Dust Action Plan will sustain the impact of dust generating activities to a suitable level. All potential impacts of construction and demolition phase activities were predicted to range from **minor, adverse** to **neutral** in significance at all identified discrete receptors.
- 10.141 An assessment was made of the potential air quality impacts associated with the operational phase of the proposed development. These were considered to include emissions associated with operational phase road vehicles and odour from commercial kitchens and meat and fish market.
- 10.142 Impacts of the operational phase road traffic were monitored using the ADMS-Roads atmospheric dispersion model. Impacts for both annual mean NO₂ and PM₁₀ were predicted to be **neutral** in significance.
- 10.143 Impacts of the operational phase odour emissions were predicted on a qualitative basis, however due to the distance between identified receptors and the mitigation measures considered with in the design, impacts are considered to be **neutral** in significance.