



Air Quality Assessment

Jacksons Corner, Reading

For SG Capital, International House, 1-6 Yarmouth Place, W1J 7BU

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1. Executive Summary

An assessment of potential air quality impacts arising from the construction and operation of the proposed mixed-use development at Jacksons Corner, Reading has been undertaken.

During the construction phase, the site has the potential to generate dust nuisance beyond the application boundary. However, through the implementation of a Dust Management Plan, the impacts will be effectively minimised and are unlikely to be significant.

The proposed development has no allocated parking and is therefore not expected to generate significant traffic during the operational phase.

2. Introduction

This report presents an assessment of the potential impact on local air quality of the construction and operation of the proposed mixed-use development at Jacksons Corner, Reading. The proposed development includes the partial demolition of the existing building and the re-development of the site to provide 1,709 m² of retail (A1) and 2,278 m² of residential (C3) space.

The location of the proposed development site is presented in Figure 1. The site falls within the Reading Air Quality Management Area (AQMA) which has been designated due to measured and modelled exceedances of the annual mean air quality objectives for nitrogen dioxide (NO₂). The primary source of emissions of NO₂ in the Borough is road traffic.

The source and significance of potential impacts associated with the development are identified and the measures that should be employed to minimise these impacts are described.



Figure 1. Location of Proposed Development (showing site boundary outlined in bold red line)

3. Policy Context

3.1 European Legislation

Within the European Union, ambient air quality is currently regulated through the Ambient Air Quality Directive 2008/50/EC¹ and the Fourth Daughter Directive 2004/107/EC². These directives set limit values and target values for ambient pollutant concentrations. The limit values are legally binding and must not be exceeded, whereas the target values are to be attained where it is cost effective to do so.

The Ambient Air Quality Directive provides limit values for sulphur dioxide (SO₂), nitrogen dioxide (NO₂), benzene (C₆H₆), carbon monoxide (CO), lead (Pb) and particulate matter (PM₁₀ and PM_{2.5})³. The Fourth Daughter Directive provides target values for arsenic (As), cadmium (Cd), nickel (Ni), benzo(a)pyrene (B(a)P), mercury (Hg) and polycyclic aromatic hydrocarbons (PAH)⁴.

The EU limit values have been adopted into UK law via the Air Quality Standards Regulations 2010⁵.

In the context of the proposed development, the primary pollutants of concern are NO₂, PM₁₀ and PM_{2.5} from traffic on roads close to the site. A summary of the European limit values for the protection of human health for these pollutants is presented in Table 1.

Pollutant	Averaging Period	Limit Value (µg/m ³)	Comments
NO ₂	1-hour	200	Not to be exceeded more than 18 times per calendar year (equivalent to the 99.8 th percentile of 1-hour means)
	Calendar year	40	-
PM ₁₀	1-day	50	Not to be exceeded more than 35 times per year (equivalent to the 90.4 th percentile of 24-hour means)
	Calendar Year	40	-
PM _{2.5}	Calendar Year	25	Stage 1 LV (to be met by 01/01/15)
	Calendar Year	20	Stage 2 LV (to be met by 01/01/20)

Table 1. European Limit Values for the Protection of Human Health

3.2 National Legislation

3.2.1 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

The Air Quality Strategy for England, Wales and Northern Ireland⁶ was published in 2007 and sets out policy targets (objectives) for SO₂, NO₂, C₆H₆, CO, Pb, PM₁₀, PM_{2.5}, 1,3-butadiene (C₄H₆) and PAH. These objectives are generally in line with those set by the European Directives, although more stringent particulate and benzene objectives apply in Scotland (and in Northern Ireland for benzene).

The air quality objectives (AQO) for NO₂, PM₁₀ and PM_{2.5} in England do not differ from those presented in Table 1.

¹ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

² Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

³ Particulate matter with an aerodynamic diameter below 10 µm and below 2.5 µm.

⁴ Polycyclic aromatic hydrocarbons other than benzo(a)pyrene.

⁵ The Air Quality Standards Regulations 2010, Statutory Instrument 2010 No. 1001, Environmental Protection.

⁶ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Department for Environment, Food and Rural Affairs in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland, July 2007.

3.2.2 Local Air Quality Management

The framework for Local Air Quality Management (LAQM) in the UK was introduced by the Environment Act 1995⁷. Local Authorities are required to regularly review and assess air quality to establish whether there are any locations where pollutant concentrations exceed the relevant air quality objectives or EU limit values. Where an exceedance is identified the local authority is obliged to declare an Air Quality Management Area (AQMA) and prepare an Action Plan setting out measures to improve air quality and achieve compliance with the objective(s).

3.2.3 The National Planning Policy Framework

The National Planning Policy Framework (NPPF)⁸ sets out the Government's policies for planning and how these should be applied. With regard to air quality, the NPPF states that local "Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

The National Planning Policy Guidance (NPPG)⁹, published in March 2014, outlines the principles upon which the planning process can take account of air quality impacts associated with new developments. It outlines the role of Local Plans in promoting sustainability and providing limitations on development in areas of poor air quality. An emphasis is placed on consultation with the planning authority to determine whether there are any local issues with the potential to affect the scope of an air quality assessment. Typical air quality mitigation measures are outlined highlighting the use of planning conditions and funding obligations to off-set any significant impacts.

3.3 Local Policy

3.3.1 Reading Borough Council Local Development Framework

Policy CS34 (Pollution and Water Resources) of the Reading Borough Core Strategy¹⁰ sets out the Council's requirements for new developments with respect to air quality as follows:

- Development will only be permitted where it would not be damaging to the environment through air, land, noise or light pollution; and
- Proposals for development that are sensitive to the effects of air, noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.

Detailed planning policies are set out in the Boroughs Sites and Detailed Policies Document¹¹. Policy DM19 (Air Quality) states that "Development should have regard to the need to improve air quality and reduce the effects of poor air quality. Development that would detrimentally affect air quality will not be permitted unless the effect is to be mitigated. The following criteria should be taken into account:

- Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would significantly reduce air quality;
- Whether the development is within, or accessed via, an Air Quality Management Area; and

⁷ Part IV of the Environment Act 1995

⁸ National Planning Policy Framework, Department for Communities and Local Government, March 2012.

⁹ <http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/>

¹⁰ Reading Borough Local Development Framework Core Strategy, Adopted January 2008, with alteration adopted 27th January 2015

¹¹ Reading Borough Local Development Framework Sites and Detailed Policies Document, Adopted January 2008, with alteration adopted 27th January 2015

- Whether it can be demonstrated that a local reduction in air quality would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.

Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within, an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application.

Where required, planning obligations will be used to secure contributions to measures to tackle poor air quality or for air quality monitoring.”

3.3.2 Reading Borough Council Review and Assessment of Air Quality

RBC regularly review and assess air quality within the Borough in accordance with the requirements of Defra.

Historically, routine monitoring of pollutant concentrations in Reading has identified widespread exceedances of the annual mean air quality objective for NO₂. As a consequence the Council have declared an AQMA which encompasses the town centre, major radial roads in to the town and corridors alongside railways lines where they pass through built up areas.

The Council’s 2014 Progress Report¹², indicates that the annual mean NO₂ objective is still widely exceeded at roadside locations within the Borough.

RBC’s Air Quality Action Plan¹³ outlines the Council’s commitment to improving air quality in the Borough. Actions to reduce impacts are categorised as follows:

- Air Pollution Transport Measures – including improvements to core infrastructure, encouraging sustainable transport within the planning process and promoting green travel plans to schools and businesses.
- Air Pollution Other Sources – including minimising the impact of the Reading Festival, raising awareness of Reading’s smoke control areas and offering energy efficiency advice to householders.
- Air Pollution Development Control – including ensuring that new developments do not result in any further deterioration in air quality and requiring major developments to be located in areas that are highly accessible by sustainable modes of transport
-
- Air Pollution Other Measures – including to continuing to expand the air quality monitoring programme and improving the accessibility of air quality information to the general public.

¹² 2014 Air Quality Progress Report for Reading Borough Council, April 2014

¹³ Reading Borough Council Air Quality Action Plan, January 2009

4. Methodology

4.1 Construction Dust Impacts

The potential impact of dust generated during site enabling, earthworks and construction works at the proposed development has been undertaken in accordance with the Institute of Air Quality Management (IAQM) construction dust guidance¹⁴. A full description of the construction dust methodology is provided in Appendix A.

A detailed assessment of dust impacts is required where there are human or ecological receptors within:

- 50m of the site boundary; or
- 50m of the route(s) used by construction vehicles on public roads, up to 500m from the site entrance(s).

The IAQM/ SPG methodology allows the potential risk of dust soiling and human health effects to be determined, based primarily on the sensitivity of nearby receptors (human and ecological) and the anticipated magnitude of the dust emission due to:

- Demolition;
- Earthworks;
- Construction; and
- Track-out (re-suspended dust from vehicle movements).

The assessment of dust risk is also based on professional judgement taking into account factors such as the prevailing wind direction, the proposed construction phasing, the likely duration of dust raising activities, local topography and existing air quality.

A range of best practice mitigation measures are provided within the guidance, which are dependent on the level of dust risk attributed to the site. It is recommended that these measures are incorporated into a Dust Management Plan (DMP) for the proposed development.

The significance of the residual impacts following appropriate mitigation is determined by professional judgement.

4.2 Construction and Operational Traffic Impacts

The recently published Environmental Protection UK (EPUK)/ IAQM planning guidance¹⁵, states that for developments within or near an AQMA, a detailed assessment of traffic-related impacts is required where:

- There is a change in the annual average daily traffic (AADT) flow of light goods vehicles (LGV) of more than 100 vehicles; and/or
- There is a change in the AADT flow of heavy goods vehicles (HGV) of more than 25 vehicles; and/or
- There is a change in the road re-alignment by more than 5m; and/or
- A new junction is introduced, which will significantly alter vehicle speeds.

Detailed information regarding the likely traffic that will be generated by the proposed development during the construction phase is not currently available. However, based on the size of the application site and the nature of the proposals it is considered unlikely that the site will generate more than 5 to 10 HGV movements per day.

¹⁴ Guidance on the assessment of dust from demolition and construction, IAQM, February 2014

¹⁵ Land-use Planning and Development Control: Planning for Air Quality, Guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land use planning and development control process, May 2015.

The proposed development will not have any allocated parking and will therefore not generate any significant traffic during the operational phase.

On the basis of the EPUK/IAQM criteria a detailed assessment is therefore not required for construction or operational traffic and the significance of the impact of traffic emissions associated with the development is considered to be *negligible*.

4.3 Existing Traffic

Due to the small size of the proposed development, a traffic survey of existing flows on roads adjacent to the site has not been undertaken in support of the application. As a consequence it has not been possible to undertake dispersion modelling to determine the potential impact of air quality on future occupants of the development. However, a review of local air quality monitoring data for the local area has been undertaken to determine the likelihood of an exceedence of the air quality objectives at the site and mitigation measures recommended to minimise any potential impacts.

4.4 Building-Related Emissions

Air Source Heat Pumps will be used to provide heat and hot water to the proposed ground-floor retail units and an individual low-NO_x gas boiler will be installed in each residential dwelling.

5. Existing Air Quality

5.1 Local Air Quality Monitoring

RBC operates four automatic air quality monitoring stations (AQMS) in the Borough. Details of these sites are summarised in Table 2. All four sites are calibrated to Defra's Automatic Urban and Rural Monitoring Network (AURN) standards and the data are subject to high levels of QA/QC.

Site Name	Type	Easting	Northing	Pollutants Monitored	Distance from Kerb	Approximate Location Relative to Proposed Development
Reading AURN	Urban Background	473441	173198	NO ₂ , PM ₁₀ , PM _{2.5}	100 m	1.7 km ESE
Caversham Road (RD1)	Roadside	471153	174429	NO ₂ , PM ₁₀	3 m	1 km NNW
Kings Road (RD2)	Roadside	473057	173205	NO ₂ , PM ₁₀	5 m	1.4 km ESE
Oxford Road (RD3)	Roadside	468700	174126	NO ₂ , PM ₁₀	6 m	3.1 km WNW

Table 2. Automatic Air Quality Monitoring Sites in Reading

Annual mean NO₂ and PM₁₀ concentrations measured at these sites between 2010 and 2015 are summarised in Tables 3 and 4, together with the number of measured exceedances of the short-term AQO's.

Site Name / Statistic	2010	2011	2012	2013	2014	2015
Annual Mean NO ₂ (µg/m ³)						
Reading AURN	26	27	25	27	27	n/a
Caversham Road (RD1)	48	46	47	43	41 (a)	38 (a)
Kings Road (RD2)	53	53 (a)	54	61	49 (a)	49 (a)
Oxford Road (RD3)	39	37	38	43 (a)	35	31
Number of Predicted Exceedances of the 1-Hour Mean AQO for NO ₂ of 200 µg/m ³ (b)						
Reading AURN	0	2	0	0	0	n/a
Caversham Road (RD1)	7	1	0	3	0 (a)	0 (a)
Kings Road (RD2)	3	0 (155)	0	4	1 (a)	1 (a)
Oxford Road (RD3)	0	0	0	3 (156)	0	0
(a) Data capture < 90%						
(b) Where possible, if the data capture is < 90%, the 99.8 th percentile of hourly means is presented in brackets.						

Table 3. NO₂ Concentrations Measured at AQMS's in Reading

Site Name / Statistic	2010	2011	2012	2013	2014	2015
Annual Mean PM ₁₀ (µg/m ³)						
Reading AURN	16	19	18 (a)	13	14	n/a
Caversham Road (RD1)	27	32	32	34	33 (a)	28 (a)
Kings Road (RD2)	26	31	29	32	31 (a)	25
Oxford Road (RD3)	25	25	24	23 (a)	21	23
Number of Predicted Exceedances of the 24-Hour Mean AQO for PM ₁₀ of 50 µg/m ³ (b)						
Reading AURN	1	8	8	n/a	3	n/a
Caversham Road (RD1)	7	30 (52)	33	34	31 (a)	8 (a)
Kings Road (RD2)	3	29	18	24	36 (a)	14
Oxford Road (RD3)	5	16	13	4 (49)	4	7
(a) Data capture < 90%						
(b) Where possible, if the data capture is < 90%, the 90.4 th percentile of 24-Hour means is presented in brackets.						

Table 3. PM₁₀ Concentrations Measured at AQMS's in Reading

The automatic monitoring data show that annual mean NO₂ concentrations at roadside locations continue to exceed the AQO of 40 µg/m³, however compliance with the short-term objective is achieved at all four sites. The annual mean NO₂ concentrations at the urban background AURN site are less than 75% of the objective.

On the whole, PM₁₀ concentrations at all four sites are within the short and long-term AQO, however an exceedence of the short-term objective occurred at Kings Road in 2014. Recent increases in PM₁₀ concentrations at Caversham Road and Kings Road have been attributed to dust and emissions from haulage associated with the redevelopment of Reading's railway station.

Annual mean NO₂ concentrations are also measured by RBC via an extensive network of passive diffusion tubes. The majority of the tubes are located close to the Inner Distribution Road (IDR) which encircles the town centre or along the major radial roads into town. There are two monitoring locations in the town centre that are considered relevant to the assessment; Friar Street, a busy road with a high proportion of buses and taxis, and Gerrard Street, a one-way street which provides access to a large NCP car park. Annual mean NO₂ concentrations measured at these locations between 2011 and 2014 are presented in Table 5. The data have been adjusted for laboratory bias using locally derived factors.

Site Name	Type	Easting	Northing	2011	2012	2013	2014
Gerrard Street	Roadside	471422	173694	33 (a)	39	52 (a)	41.4
Friar Street	Roadside	471437	173589	n/a	52	52	53.0
(a) Poor data capture so results should be treated with caution.							

Table 5. Annual Mean NO₂ Concentrations Measured by Diffusion Tube Monitoring Sites in the vicinity of the Proposed Development

Annual mean NO₂ concentrations measured at the Friar Street site significantly exceed the air quality objective and whilst the data capture has been poor the results also indicate a potential exceedence at Gerrard Street. The proposed development is located at the junction of High Street with King's Road, approximately 350m southeast of the Friar Street monitoring site. High Street is a one-way street with access restricted to buses, bicycles, wheelchair accessible taxis and permit holders only during peak periods, however both High Street and King's Road serve as major bus routes and it is therefore likely that existing NO₂ concentrations in the vicinity of the development will be close to or exceed the annual mean AQO.

Diffusion tubes are unable to measure short-term concentrations, however data from across the UK¹⁶ have shown that the 1-hour mean AQO for NO₂ is unlikely to be exceeded unless the annual mean concentration is greater than 60 µg/m³. The annual mean concentrations measured at Friar Street are below this threshold, indicating that compliance with the short-term objective is likely to be achieved.

¹⁶ D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites, July 2003

6. Construction Phase Impacts

6.1 Sensitivity of the Area to Dust Impacts

The proposed development site is situated in the town centre, with a number of shops, businesses and residential dwellings within 20m of the site boundary. The sensitivity of the area to dust soiling impacts is therefore considered to be *high*.

Local monitoring data indicates that there is unlikely to be an exceedence of the annual mean AQO for PM₁₀ at the development site. However, due to the large number of buses using the roads adjacent to the site, existing PM₁₀ concentrations are likely to be somewhat higher than the urban background level. It is assumed, therefore, that the existing annual mean concentration is likely to exceed 24 µg/m³ and based on the large number of sensitive receptors in the locality, the sensitivity of the area to human health impacts is also considered to be *high*.

There are no dust sensitive ecological sites within 50 m of the proposed development, therefore impacts on ecology have not been considered in the assessment.

A wind rose from Heathrow Airport is presented in Figure 5, which shows that the prevailing wind is from the west and southwest, therefore receptors to the east and northeast of the site are most likely to experience dust impacts during the construction phase.

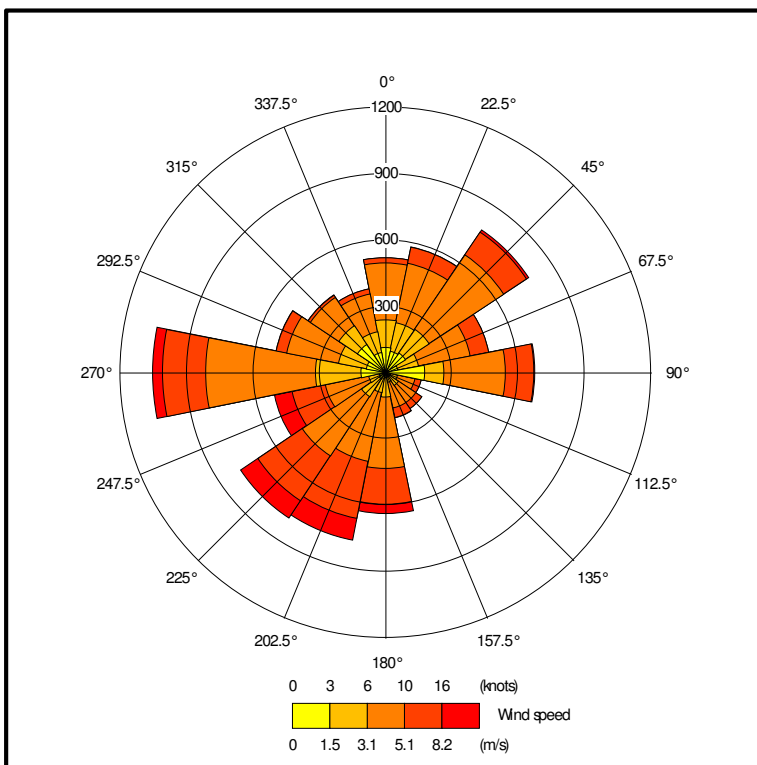


Figure 2. Wind Rose for Heathrow Airport 2013

6.2 Demolition

The proposed development site is currently occupied by a four storey building which abuts High Street and King's Road. To the rear are several obsolete storage and workshop buildings that will be demolished prior to any further works on site. The estimated volume of the buildings that will be demolished is just 4,400 m³, however the buildings are approximately 12m high and it is anticipated that crushing and screening will be undertaken on site. On this basis the magnitude of the dust emission during the demolition phase is considered to be *medium*.

6.3 Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. It may also involve levelling of the site and landscaping.

Earth works will only be undertaken at the rear of the site, which is not sufficiently large to accommodate large numbers of earth moving vehicles or enable long-term stockpiling of materials. The magnitude of the dust emission from earthworks is considered to be *small*.

6.4 Construction

Dust emissions during construction will depend on the scale of the works, method of construction, construction materials and duration of build. For the purposes of the assessment, it has been assumed that the new buildings at the rear of the site will be of standard brick and concrete construction. Given the scale of the proposed development, the dust emission magnitude for construction is considered to be *small*.

6.5 Trackout

The site is in a town centre location and construction traffic will pass in close proximity to pedestrian footpaths and residential properties. However, due to the small size of the site, there will be no lengthy on-site roads and therefore limited potential for HGVs to pass over dusty material. The dust emission magnitude due to trackout is therefore also considered to be *small*.

6.6 Assessment of Dust Risk Prior to Mitigation

A summary of the potential risk of dust impacts prior to mitigation, based on the high overall sensitivity of the area to human health and dust soiling impacts is presented in Table 6.

Dust Source	Emission Magnitude	Human Health Risk	Dust Soiling Risk
Demolition	Medium	Medium	Medium
Earthworks	Small	Medium	Medium
Construction	Small	Medium	Medium
Trackout	Small	Low	Low
<i>Overall Risk of Dust Impacts</i>		<i>Medium</i>	

Table 6. Risk of Dust Impacts Prior to Mitigation

7. Mitigation

7.1 Construction Phase

Best Practice Guidance for dust control will be implemented, as appropriate, during the construction phase through the Dust Management Plan (DMP) for the proposed development.

The risk of dust soiling and human health impacts from the site has been assessed as medium prior to mitigation, however the risk of impacts from trackout is considered to be low. In accordance with the IAQM guidance it is recommended that the measures detailed in Table 7 are incorporated into the DMP.

General	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site Manager. • Display the head or regional office contact information.
Site management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
Monitoring	• Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked. • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. • Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site.
Preparing and maintaining the site	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Erect solid screens or barriers around dusty activities or at the site boundary that are at least as high as any stockpiles on site. • Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. • Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/machinery and sustainable travel	• Ensure all vehicles switch off engines when stationary - no idling vehicles. • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local

	extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. • Use enclosed chutes and conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste management	• Avoid bonfires and burning of waste materials
Demolition	• Ensure effective water suppression is used during demolition operations. • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Bag and remove any biological debris or damp down such material before demolition.
Construction	• Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Table 7. Recommended Mitigation Measures

The significance of dust impacts on nearby receptors following the implementation of appropriate and best practice mitigation is considered to be *negligible*.

7.2 Operational Phase

The proposed development will have no allocated parking, however 28 secure cycle parking spaces will be provided to encourage sustainable travel.

A review of local air quality monitoring data has indicated that concentrations of NO₂ may exceed the annual air mean quality objective at the front façade of the proposed development, therefore mechanical ventilation with heat recovery (MVHR) units will be installed to all road facing residential units.

8. Summary and Conclusions

An assessment has been undertaken to determine the potential impact on local air quality associated with the construction and operation of the proposed mixed-use development at Jacksons Corner, Reading.

The proposed development will have no allocated parking therefore the significance of operational impacts associated with the site is considered to be negligible.

An assessment of the potential impacts during the construction phase has been carried out in accordance with the latest Institute of Air Quality Management guidance. This has shown that releases of dust and PM₁₀ are likely to occur during site activities. The risk of dust soiling and health impacts at neighbouring properties has been assessed as medium. Through good site practice and the implementation of suitable mitigation measures, the impact of dust and PM₁₀ releases may be effectively mitigated and the resultant impacts are considered to be negligible.

A review of local monitoring data indicates that there may an exceedence of the air quality objective for NO₂ at the roadside façade of the development; MVHR will therefore be installed in all road-facing residential units.

It is considered that air quality should not pose a constraint to the re-development of the site as proposed.

Appendix A – IAQM Construction Dust Methodology

Factors defining the sensitivity of a receptor to dust impacts are presented in Table A1.

Sensitivity	Human Health	Dust Soiling	Ecological
High	- Locations where members of the public are exposed over a time period relevant to the air quality objectives for PM₁₀ (a) - Examples include residential dwellings, hospitals, schools and residential care homes.	- Regular exposure - High level of amenity expected. - Appearance, aesthetics or value of the property would be affected by dust soiling. - Examples include residential dwellings, museums, medium and long-term car parks and car showrooms.	- Nationally or Internationally designated site with dust sensitive features (b) - Locations with vascular species (c)
Medium	- Locations where workers are exposed over a time period relevant to the air quality objectives for PM₁₀ (a) - Examples include office and shop workers (d)	- Short-term exposure - Moderate level of amenity expected - Possible diminished appearance or aesthetics of property due to dust soiling - Examples include parks and places of work	- Nationally designated site with dust sensitive features (b) - Nationally designated site with a particularly important plant species where dust sensitivity is unknown
Low	- Transient human exposure - Examples include public footpaths, playing fields, parks and shopping streets	- Transient exposure - Enjoyment of amenity not expected. - Appearance and aesthetics of property unaffected - Examples include playing fields, farmland (e), footpaths, short-term car parks and roads	Locally designated site with dust sensitive features (b)
(a) In the case of the 24-hour objective, a relevant location would be one where individuals may be exposed for eight hours or more in a day. (b) Ecosystems that are particularly sensitive to dust deposition include lichens and acid heathland (for alkaline dust, such as concrete). (c) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee. (d) Does not include workers exposure to PM₁₀ as protection is covered by Health and Safety at Work legislation. (e) Except commercially sensitive horticulture.			

Table A1. Receptor Sensitivity

The sensitivity of the area as a whole is dependent on the number of receptors within each sensitivity class and their distance from the source. Human health impacts are also dependent on the existing PM₁₀ concentrations in the area.

Table A2 and Table A3 summarise the criteria for determining the overall sensitivity of the area to dust soiling and health impacts respectively. The sensitivity of the area to ecological impacts is presented in Table A4.

Receptor Sensitivity	Number of Receptors	Distance from the Source			
		<20m	<50m	<100m	<350m
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A2. Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Annual Mean PM ₁₀	Number of Receptors	Distance from the Source				
			<20m	<50m	<100m	<200m	<350m
High	>32	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 - 32	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 - 28	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A3. Sensitivity of the Area to Health Impacts from Dust

Receptor Sensitivity	Distance from the Source	
	<20m	<50m
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table A4. Sensitivity of the Area to Ecological Impacts from Dust

The magnitude of the dust impacts for demolition, earthworks, construction and trackout is classified as small, medium or large depending on the scale of the proposed works as detailed in Table A5.

Dust Source	Large	Medium	Small
Demolition	- Total building volume >50,000m³ - Potentially dusty material (e.g. concrete) - Onsite crushing and screening - Demolition activities >20m above ground level.	- Total building volume 20,000 - 50,000m³ - Potentially dusty material - Demolition activities 10 - 20m above ground level.	- Total building volume <20,000m³ - Construction material with low potential for dust release - Demolition activities <10m above ground level - Demolition during wetter months
Earthworks	- Total site area >10,000m² - Potentially dusty soil type (e.g. clay) >10 heavy earth moving vehicles active at any one time - Formation of bunds >8m in height - Total material moved >100,000 tonnes	- Total site area 2,500 - 10,000m² - Moderately dusty soil type (e.g. silt) 10 heavy earth moving vehicles active at any one time - Formation of bunds 4 - 8m in height - Total material moved 20,000 - 100,000 tonnes	- Total site area <2,500m² - Soil type with large grain size (e.g. sand) <5 heavy earth moving vehicles active at any one time - Formation of bunds <4m in height - Total material moved <20,000 tonnes - Earthworks during wetter months
Construction	- Total building volume >100,000m³ - On site concrete batching - Sandblasting	- Total building volume 25,000 - 100,000m³ - Potentially dusty construction material (e.g. concrete) - On site concrete batching	- Total building volume <25,000m³ - Material with low potential for dust release (e.g. metal cladding or timber)
Trackout	>50 HGV movements in any one day (a) - Potentially dusty surface material (e.g. high clay content) - Unpaved road length >100m	10 - 50 HGV movements in any one day (a) - Moderately dusty surface material (e.g. silt) - Unpaved road length 50 - 100m	<10 HGV movements in any one day (a) - Surface material with low potential for dust release - Unpaved road length <50m
HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes			

Table A5. Dust Emission Magnitude Criteria

For each dust emission source, the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts prior to mitigation as illustrated in Tables A6 and A7.

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible Risk

Table A6. Risk of Dust Impacts from Demolition, Earthworks and Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible Risk
Low	Low Risk	Low Risk	Negligible Risk

Table A7. Risk of Dust Impacts from Trackout