

7 AIR QUALITY

Introduction

- 7.1 This chapter of the ES considers the potential impacts and likely effects of the proposed development on air quality. The assessment includes a review the existing air quality within the study area; considers the suitability of the application site for the proposed development; and assesses the impact of the demolition and construction stage and completed development stage of the proposed development on air quality in the surrounding study area. Potential sources of emissions have been identified and assessed in the context of existing air quality and the nature and location of receptors.
- 7.2 The main air pollutants of concern are dust and particulate matter with an aerodynamic diameter of less than 10 µm (PM₁₀), typically generated during demolition and construction activities, and nitrogen dioxide (NO₂), PM₁₀ and particulate matter with an aerodynamic diameter of less than 2.5 µm (PM_{2.5}), which are generated by road traffic and rail emissions.
- 7.3 The chapter provides a description of the methodology used in the assessment. This is followed by a description of the relevant baseline conditions at the application site and surrounding study area, and an assessment of the likely significant effects of the proposed development on air quality taking into account embedded mitigation. Additional mitigation measures are identified where appropriate to avoid, reduce or offset any significant adverse effects identified, and an overview provided of the nature and significance of residual effects. A cumulative scheme assessment has also been undertaken which considers the in-combination effects from the proposed development and other cumulative schemes.
- 7.4 The chapter is accompanied by the following technical appendices in ES Volume 3:
- Appendix 7.1: Consultation with the Environmental Health Officer; and
 - Appendix 7.2: Air Quality Technical Appendix.

Methodology

- 7.5 The assessment has been informed by the following legislation, policies and published guidance:
- International Legislation including:
 - The European Air Quality Framework Directive and Daughter Directives^{1, 2};
 - National Legislation including:
 - Part IV of the Environment Act 1995 (as amended)³;
 - NPPF⁴;
 - PPG⁵;
 - Regional Policy including:

- Reading Borough Local Plan⁶;
- RBC Air Quality Action Plan (as revised)⁷;
- National guidance and industry standards, including:
 - Air Quality Strategy for England, Scotland, Wales and Northern Ireland⁸, which implements the European Union’s Directives and sets out the air quality objectives (AQOs) and government policy on achieving these objectives;
 - Air Quality Standards (Amendment) Regulations 2016⁹ which amended the Standard Regulations 2010¹⁰;
 - Local Air Quality Management Technical Guidance 2016 (LAQM.TG(16))¹¹, which provides advice as to where the national AQOs apply and support to local authorities in carrying out their duties under the Environment Act 1995¹² and subsequent regulations;
 - IAQM guidance on the Assessment of Dust from Demolition and Construction¹³; and
 - IAQM guidance on Land-Use Planning and Development Control: Planning for Air Quality¹⁴.

7.6 Further details of the relevant guidance is included in ES Volume 3: Technical Appendix 7.2.

Consultation

- 7.7 At the time of undertaking the assessment, the EIA Scoping Opinion remains outstanding.
- 7.8 In addition to the formal EIA Scoping Process, consultation with the RBC environmental health officer (EHO) was undertaken regarding the Scoping Report and the assessment methodology. Table 7.1 summarises the consultation that was undertaken with respect to the air quality assessment.

Table 7.1: Summary of Consultation		
Consultee and Form/Date of Consultation	Summary of Comments	Action Taken
RBC EHO. Consultation e-mail sent 16 December 2019 to confirm the Air Quality Assessment Methodology (Volume 3: Technical Appendix 7.1). A response was received from EHO on 19 December 2019.	Qualitative assessment of the potential impact on local air quality from demolition and construction activities to be scoped into assessment.	A construction dust assessment has been undertaken and reported in the Assessment of Effects Section.
	Potential impacts on local air quality from the proposed development associated traffic emissions to be scoped into the assessment.	The proposed methodology has been agreed and followed. An assessment of potential on- and off-site impacts from road traffic and rail emissions has been undertaken and reported in the Assessment of Effects Section.
	Potential impacts from existing road traffic and rail emissions on the	

¹ European Commission. Directive 2008/50/EC. 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 European Air Quality Directive 2004/107/EC. European Air Quality 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 Secretary of State, 1995.The Environment Act 1995 part IV Air Quality, HMSO

⁴ Ministry of Housing, Communities and Local Government, 2019. National Planning Policy Framework. HMSO.

⁵ <https://www.gov.uk/government/collections/planning-practice-guidance>.

⁶ Reading Borough Council, 2019. Reading Borough Local Plan.

⁷ Reading Borough Council, 2009. Air Quality Action Plan.

⁸ Department of the Environment, Transport and the Regions (DETR) in Partnership with the Welsh Office, Scottish Office and Department of the Environment for Northern Ireland, 2007. The Air Quality Strategy for England, Scotland, Wales, Northern Ireland. HMSO, London.

⁹ Statutory Instrument, 2016. No. 1184, The Air Quality Standards (Amendment) Regulations 2016. HMSO, London.

¹⁰ Statutory Instrument, 2010. No. 1001, The Air Quality Standards Regulations 2010. HMSO, London.

¹¹ Department of the Environment, Food and Rural Affairs (Defra) in partnership with the Scottish Executive, The National Assembly for Wales and the Department of the Environment for Northern Ireland, 2016. Local Air Quality Management Technical Guidance, LAQM.TG(16). HMSO, London.

¹² Environment Act 1995, Part IV.

¹³ Holman et al, 2014. IAQM Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, London.

¹⁴ Moorcroft and Barrowcliffe. et al., 2017. Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London.

Table 7.1: Summary of Consultation		
Consultee and Form/Date of Consultation	Summary of Comments	Action Taken
	proposed development to be scoped into the assessment.	
	No heating plant is being proposed as part of the proposed development.	Energy Plant emissions impacts have been scoped out of the assessment.
	No off-site industrial emissions in close proximity to the proposed development identified.	No action required.
	Modelled concentrations compared against the closest local monitoring data in order to verify the model output.	The ADMS model outputs have been verified as detailed in ES Volume 3: Technical Appendix 7.2.

Assessment Scope

- 7.9 The assessment has been based on a series of development parameters, assumptions and commitments, as described in Chapter 2: EIA Process and Methodology, in Chapter 4: Proposed Development Description, and in Chapter 5: Demolition and Construction Environmental Management. Due to the flexibility being sought in respect of land use classes, the air quality assessment has been undertaken based on a worst-case interpretation of the minimum and maximum land use schedule presented in Chapter 4: Proposed Development Description.
- 7.10 Therefore, the vehicle trip generation has been calculated based on the use classes with the highest trip generation and it has been assumed that the proposed development would be for residential use as that represents the most air quality sensitive receptor. The assessment therefore provides a ‘worst-case scenario’ for both the existing receptors and the proposed development regardless of use.

Technical Scope

- 7.11 The technical scope of the assessment has considered the following:
 - Demolition and construction stage activities dust emissions following the IAQM Dust Guidance, identifying appropriate construction mitigation measures based on the identified level of risk;
 - Demolition and construction traffic on the main road network, transporting materials and the workforce to and from the application site;
 - Operational road traffic emissions generated by residents, workers and visitors to the proposed development;
 - Assessment of impacts in relation to IAQM Guidance on Planning for Air Quality for existing receptors; and
 - The potential exposure of future occupants of the proposed development to poor air quality including that from railway emissions generated by rail lines passing through Reading Railway Station.
- 7.12 Information regarding the demolition and construction works for the proposed development, specific activities and predicted traffic movements, is presented in Chapter 5: Demolition and Construction Environmental Management.
- 7.13 Vehicle movements associated with access, demolition and construction would vary through the construction programme, with short periods of peak heavy-duty vehicles (HDVs) movements mainly associated with excavation works and the delivery of materials. However, when the HDV movements are averaged over a full year period (Annual Average Daily Traffic - AADT), these would be significantly lower than peak movements. The maximum annual average number of HDV movements would be associated with the demolition, piling and earthworks, with an average of 140 two-way movements per

week (in and out) during the standard demolition and construction working hours. When averaged over 24 hours and 7-day period the demolition and construction HDV daily movements would be below the threshold of 25 daily movements within an Air Quality Management Area (AQMA) for an assessment to be necessary according to IAQM guidance. Further mitigation would be provided through the implementation of the CEMP. Accordingly, the effects of demolition and construction related vehicle emissions would be negligible and have not been considered further within this chapter.

Spatial Scope

- 7.14 The study area for the demolition and construction stage assessment is defined as up to 350 m from the application site boundary for the assessment of demolition and construction dust emissions, as per the Institute of Air Quality Management’s (IAQM) Dust Guidance.
- 7.15 For the completed development stage assessment, the study area for human health receptors for road traffic and rail emissions is defined as roads within 250 m of the application site, existing receptors and those roads which experience a significant increase in development traffic leading to adverse effects on local air quality, as per IAQM guidance² and Local Air Quality Management Technical Guidance. The approximate extent of the study area is shown in Figure 7.1.

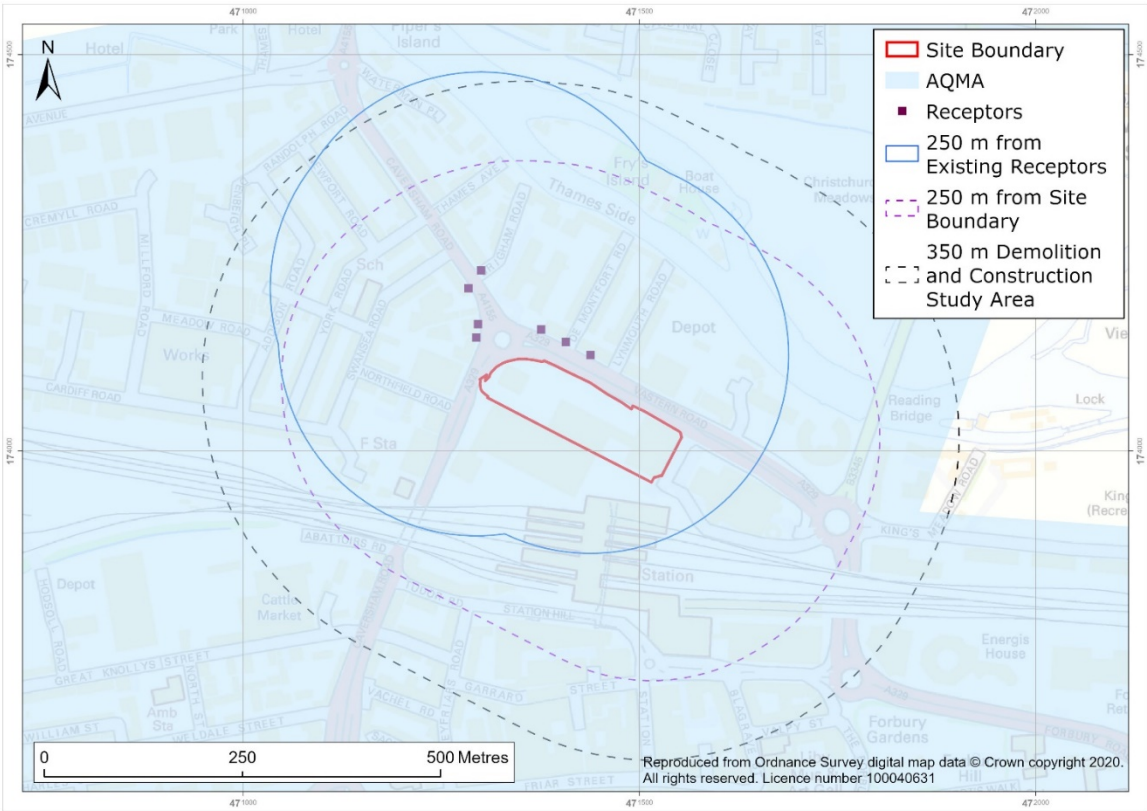


Figure 7.1: Spatial Scope

- 7.16 No designated ecological sites or other sensitive ecological receptors have been identified within the study area.
- 7.17 No existing off-site sources of industrial emissions have been identified within the study area that could have a potentially significant impact on the proposed development.

Temporal Scope

- 7.18 The baseline has been informed by continuous and passive air quality monitoring conducted by RBC covering up to 2018 and by traffic flow data provided by the transport consultant, Cole Easdon

Consultants, from surveys undertaken in 2019. As the change in traffic volume is considered negligible in the study area between 2018 and 2019, the baseline year has been assessed as 2018.

- 7.19 The anticipated year of opening for the completed development is 2025, with an earliest year of occupation in 2022. As road traffic emissions are predicted to decline with time, and to enable a more robust assessment approach, 2022 emission factors and background concentrations have been used to inform the air quality assessment. Predicted traffic flows for 2025 have been used as this represents the worst case in terms of the full extent of traffic generation from the proposed development.
- 7.20 In carrying out the assessment of completed development stage traffic impacts, the following temporal scope for the assessment scenarios has been assessed:
- Existing baseline 2018 (2019 traffic flows with 2018 air quality data to allow verification of the model predictions);
 - Future baseline 2025 (using 2022 emission factors and background concentrations, as detailed above) + cumulative schemes;
 - Future baseline 2025 + cumulative schemes + proposed development.

Baseline Characterisation Method

Desk Study

- 7.21 In order to establish baseline air quality at and within the vicinity of the application site, relevant monitoring data was reviewed and assessed. Data was obtained from the following sources:
- Continuous and passive air quality monitoring conducted by RBC covering up to 2018 and reported in the 2019 Air Quality Annual Status Report (ASR)¹⁵; and
 - National pollution maps published by Defra. These cover the whole country on a 1x1 km grid¹⁶.

Field Study

- 7.22 No site-specific field study was undertaken at the application site as the data obtained during the desk study was deemed to be adequate and representative of the application site conditions.

Assessment Method

Methodology

- 7.23 Full details of both demolition and construction and completed development stages assessment methodology, data and modelling parameters are provided in ES Volume 3: Technical Appendix 7.2.

Demolition and Construction Stage

- 7.24 During the demolition and construction stage, the main potential effects are dust annoyance and locally elevated concentrations of PM₁₀. The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source. Separation distance is also an important factor as significant dust annoyance is usually limited to within a few hundred metres of its source. This is due to the rapid decrease in concentrations with distance from the source due to dispersion.
- 7.25 The assessment of potential construction dust impacts follows the guidance published by the IAQM on the assessment of the impacts of construction on air quality¹¹. The guidance recommends that the risk

of dust emission magnitude is combined with the sensitivity of the area surrounding the site to determine the risk of dust impacts from construction and demolition activities. The risk of dust arising in sufficient quantities to cause annoyance and/or health impacts is determined using four risk categories: high, medium, low or negligible. Depending on the level of risk for each activity, appropriate mitigation is selected.

- 7.26 The assessment has been carried out in a number of steps:
- Step 1, the need for a construction assessment was screened, based on the proximity of receptors;
 - Step 2, the risk of dust impacts was assessed taking into account the level of activity and the proximity of sensitive receptors;
 - Step 3, site specific mitigation integral to/embedded within the development proposals was reviewed and supplemented where necessary; and
 - Step 4, the significance of the dust effects, after applying the application site-specific mitigation, was assessed.
- 7.27 The guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.

Completed Development Stage

- 7.28 The changes to air quality due to local traffic emissions have been predicted using the ADMS Roads¹⁷ (version 4.1.1) dispersion model. This model has been extensively validated against both field and laboratory data sets and against monitoring data in cities throughout the UK.
- 7.29 The model requires the user to provide various input data, including the Annual Average Daily Traffic (AADT) flow, the proportion of HDV, road characteristics (including road width and street canyon height, where applicable), and the vehicle speed. AADT flows and the proportions of HDVs, for roads within 250 m of the application site, and the extension of the modelled area, are presented in ES Volume 3: Technical Appendix 7.2.
- 7.30 In carrying out the assessment of operational traffic impacts, the three scenarios described in the temporal scope section above, have been assessed.
- 7.31 The model was run using 2018 meteorological data from Farnborough Station, which is considered to be the most representative meteorological monitoring station to the application site.
- 7.32 Traffic emissions were calculated using the Emission Factor Toolkit (EFT) v9, which utilises nitrogen oxides (NO_x), PM₁₀ and PM_{2.5} emission factors from the European Environment Agency COPERT 5 emission tool¹⁸. The traffic data were entered into the ADMS roads model, along with speed data to provide combined emission rates for each of the modelled road links.
- 7.33 Rail emissions were obtained from National Atmospheric Emissions Inventory¹⁹ 1 km² resolution maps for rail subsector and directly added to the model.
- 7.34 The predicted concentrations of roadside NO_x were converted to roadside NO₂ using the LAQM conversion calculator available from the Defra air quality website²⁰.
- 7.35 Concentrations were predicted at several monitoring locations using 2018 monitoring data and 2019 traffic data in order to verify the modelled results.

¹⁵ Reading Borough Council, 2019. 2019 Air Quality Annual Status Report.

¹⁶ Department of the Environment, Food and Rural Affairs (Defra), 2019. 2017 Based Background Maps for NO_x, NO₂, PM₁₀ and PM_{2.5}.

¹⁷ <https://www.cerc.co.uk/environmental-software/ADMS-Roads-model.html>.

¹⁸ Department for Environment Food and Rural Affairs. Emissions Factors Toolkit. <https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.htm>.

¹⁹ <https://naei.beis.gov.uk/emissionsapp/>

²⁰ Department for Environment Food and Rural Affairs. NO_x to NO₂ calculator. <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>

7.36 To present a robust assessment and take account of uncertainties relating to future vehicle emissions, the future modelling scenarios have utilised 2022 emission factors and background levels (as earliest potential occupation year) combined with 2025 traffic data.

Assessment Criteria

7.37 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact, duration of the effect, geographical extent of the effect and application of professional judgement.

Receptor Sensitivity Criteria
Demolition and Construction

7.38 The sensitivity of receptors has been classified as low, medium or high, in line with the IAQM guidance criteria set out in Table 7.2.

Table 7.2: Receptor Sensitivity Criteria – Demolition and Construction Stage	
Sensitivity	Criteria
Low	- The enjoyment of amenity would not reasonably be expected; or - Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or - There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. - Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.
Medium	- Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; - First occupants moving into residential dwellings on a large phased housing development; - The appearance, aesthetics or value of their property could be diminished by soiling; or - The people or property wouldn’t reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. - Indicative examples include parks and places of work.
High	- Users can reasonably expect enjoyment of a high level of amenity; or - The appearance, aesthetics or value of their property would be diminished by soiling; and - The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. - Indicative examples include dwellings, museums and other culturally important collections, medium- and long-term car parks and car showrooms.

Completed Development

Human Health Air Quality Objectives

7.39 The AQOs are the concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects on human health (including sensitive sub groups) or ecosystems. In general, these are concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects. Objectives are policy targets often expressed as maximum concentrations not to be exceeded either without exception or with a limited number of exceedances within a specified timescale.

7.40 For some pollutants, there is both a long-term (e.g. annual mean) objectives and a short-term (e.g. one hour mean) objectives. These periods reflect the varying impacts on health of differing exposures to pollutants. Long-term objectives are generally lower than short-term objectives owing to the chronic health effects associated with exposure to low concentrations of pollutants for longer periods of time.

7.41 The AQOs relevant for this assessment are presented in Table 7.3.

Table 7.3: Human Health Air Quality Objectives		
Pollutant	Time Period	Objective
Nitrogen Dioxide (NO ₂)	Annual Mean	40 µg/m ³
	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year
Fine Particulate Matter (PM ₁₀)	Annual mean	40 µg/m ³
	24-hour mean	50 µg/m ³ not to be exceeded more than 35 times a year
Fine Particulate Matter (PM _{2.5})	Annual Mean	25 µg/m ³ (to be achieved by 2020)

7.42 The sensitivity of existing receptors surrounding the application site and the roads affected by the proposed development and proposed receptors introduced by the proposed development is dictated by the land use at that location. The relevance of the land use to specific air quality objectives is specified by LAQM.TG (16)²¹. No ecological receptors have been identified in close proximity to the application site which would be impacted from air quality during the operational stage. The sensitivity of receptors has been classified by which objective applies at that location, as set out in Table 7.4.

Table 7.4: Receptor Sensitivity Criteria – Completed Development Stage	
Sensitivity	Criteria
Medium - where exposure would be short term and the 1 hour mean objective applies	All locations where the annual mean apply and: - hotels and gardens of residential properties; - kerbside sites (for example, pavements of busy shopping streets); - those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more; and - any outdoor locations where members of the public might reasonably expect to spend one hour or longer.
High - where exposure may be longer and the annual mean objective applies	All locations where members of the public might be regularly exposed to pollutants for extended periods. Building façades of residential properties, schools, hospitals, care homes etc.

Impact Magnitude Criteria
Demolition and Construction Stage

7.43 The criteria provided in the guidance produced by the IAQM was used to assess the potential risk of impacts to air quality from demolition and construction activity in the absence of mitigation during the demolition and construction stage of the proposed development as outlined in ES Volume 3: Technical Appendix 7.2. The methodology combines the magnitude of dust emissions together with the sensitivity of the receptor to identify low, medium or high risk of dust impacts in the absence of mitigation for the four stages of construction; demolition, earthworks, construction and trackout (the movement of dust and dirt from a construction/demolition site onto the public road network).

²¹ Department of the Environment, Food and Rural Affairs in partnership with the Scottish Executive, The National Assembly for Wales and the Department of the Environment for Northern Ireland, 2016. Local Air Quality Management Technical Guidance, LAQM.TG(16). HMSO, London.

Completed Development Stage

7.44 The assessment of the proposed development impacts on local air quality has used the approach developed by the IAQM and Environmental Protection UK (EPUK) guidance, which considers the change in air quality as a result of a proposed development on existing receptors. The guidance has produced a matrix which is to be used to calculate the impacts at individual receptor locations, as shown in Table 7.5. It takes into account both the magnitude of change at each receptor and the resulting overall concentration. The absolute concentration of the receptor is also taken into consideration i.e. if the receptor is close to or above the UK air quality objective level, marginal changes in magnitude may be determined to be moderate, however if the receptor is less than 75 % of the UK air quality objective level marginal changes in magnitude may be determined to be negligible.

Table 7.5: EPUK/IAQM Impact Descriptors for Individual High Sensitivity Receptors				
Long-term average concentration at receptor with development	Percentage (%) Change in Concentration Relative to Annual Mean Air Quality Objective (AQO)			
	<1	2 – 5	6 – 10	>10
75 % or less of AQO	Negligible	Negligible	Slight	Moderate
76 – 94 % of AQO	Negligible	Slight	Moderate	Moderate
95 – 102 % of AQO	Slight	Moderate	Moderate	Substantial
103 – 109 % of AQO	Moderate	Moderate	Substantial	Substantial
110 % or more of AQO	Moderate	Substantial	Substantial	Substantial
Notes: Where concentrations increase, the impact is described as adverse, and beneficial where it decreases. *% change rounded to nearest whole number. Where the % change is less than 0.5% the impact will be Negligible.				

7.45 Similar criteria have not been provided for medium sensitivity receptors where the short term air quality objectives would apply i.e. amenity and commercial locations. In urban areas, particularly where residential receptors are widespread, it is generally accepted that the annual mean objectives applicable at high sensitivity receptors are the most reliable for evaluating the severity of impacts.

7.46 Furthermore, it is difficult to predict impacts on short term objectives from traffic impacts as the air quality model (as set up for the assessment) does not provide reliable prediction of one-hour mean NO₂ concentrations. However, research has concluded that exceedances of the one-hour mean objective are unlikely to occur where annual mean concentrations do not exceed 60 µg/m³ ^{22,23}. This relationship has been used to assess whether exceedances of the hourly mean objective are likely. Similarly, PM₁₀ annual mean concentrations below 32 µg/m³ are used to screen the 24 hour PM₁₀ mean objective.

Significance Criteria

Demolition and Construction Stage

7.47 Using the IAQM assessment methodology to identify the appropriate level of mitigation, and on the assumption that the identified mitigation measures are applied and are commensurate with the risk of potential dust impacts, the IAQM guidance indicates that that the potential for residual effects to arise during the demolition and construction stage would be at worst 'slight adverse' and would be temporary in nature.

7.48 Residual effects during the demolition and construction stage would either be short term i.e. less than a year in duration.

Completed Development Stage

7.49 The IAQM guidance states that the overall significance of the effect on air quality should be based on professional judgement, taking into account the predicted impacts at the modelled receptor locations and "...will need to take into account such factors as:

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

7.50 The overall significance of the effect on local air quality, however, is a binary judgement, i.e. the overall effect is either significant or it is not significant, and there are no degrees of significance of the overall effect. Moderate or substantial impacts may be considered to be a significant environmental effect, whereas negligible or slight impacts would not be considered significant.

7.51 In the case of air quality, completed development effects are expected to be long term i.e. to persist for more than five to ten years.

Assumptions and Limitations

7.52 There are many components that contribute to the uncertainty in predicted concentrations. Although the model has been extensively validated against field data sets and their use has gained wide acceptance throughout the UK, no computer-based model is able to totally replicate actual conditions as it is required to simplify real-world conditions into a series of algorithms. The model used in this assessment also is dependent upon several sources of data which will have inherent uncertainties associated with them. The model uncertainty has been estimated using the root mean square error and is presented in ES Volume 3: Technical Appendix 7.2.

7.53 The assessment has relied on data provided by the RBC and Defra to characterise baseline conditions on the application site. It has been assumed that these data have been reported correctly.

7.54 The assessment of the air quality effects is based on a worst-case interpretation of the development parameters. The proposed development traffic impacts have been assessed using predicted traffic flows provided by the Applicant and its Transport Consultant, Cole Easton Consultants.

7.55 The traffic modelling has used 2018 background data, monitoring data, meteorological data and 2019 traffic data to verify the model. 2018 was the latest year with full monitoring results available.

7.56 The modelling has assumed a level site and has not taken terrain impacts into account.

7.57 The completed development modelling has been based on 2022 emission factors and background concentrations, whilst utilising traffic flows for 2025. This is considered to provide an appropriately conservative assessment taking into account the uncertainties regarding future vehicle emission factors. Traffic emissions were calculated using the latest Emission Factor Toolkit (EFT) v9, which utilises emission factors from the European Environment Agency COPERT 5 emission tool.

Baseline Conditions

Existing Baseline

Local Air Quality Monitoring

²² A, Cook, 2008. Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedances of the one-hour mean.

²³ Marner, D Laxen and B,2003. Analysis of the relationship between one-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites

- 7.58 RBC has declared one AQMA covering Reading City Centre and major radial routes into Reading due to exceedances of the NO₂ annual mean objective. The application site is located within Reading AQMA.
- 7.59 RBC operate both continuous automatic monitoring and passive diffusion tube monitoring of air quality at a number of locations within the borough. A summary of the closest and most representative monitoring locations is presented in Table 7.6 to Table 7.8 and the location shown in Figure 7.2.

Table 7.6: Measured NO ₂ Concentrations (µg/m ³)								
Site ID	Location	Type	Distance to Application Site (m)	Annual mean (µg/m ³)				
				2014	2015	2016	2017	2018
Automatic								
RD1	Caversham Road	R	360	41	38	39	37	40
Diffusion Tubes								
DT51	108 Caversham Road	R	126	48	41	41	40	42
DT52	31a Vastern Road	R	33	40	36	37	38	33
DT53	131 Caversham Road	R	133	47	40	36	36	35
Objective				40				
Notes: Exceedances highlighted in bold . R: Roadside.								

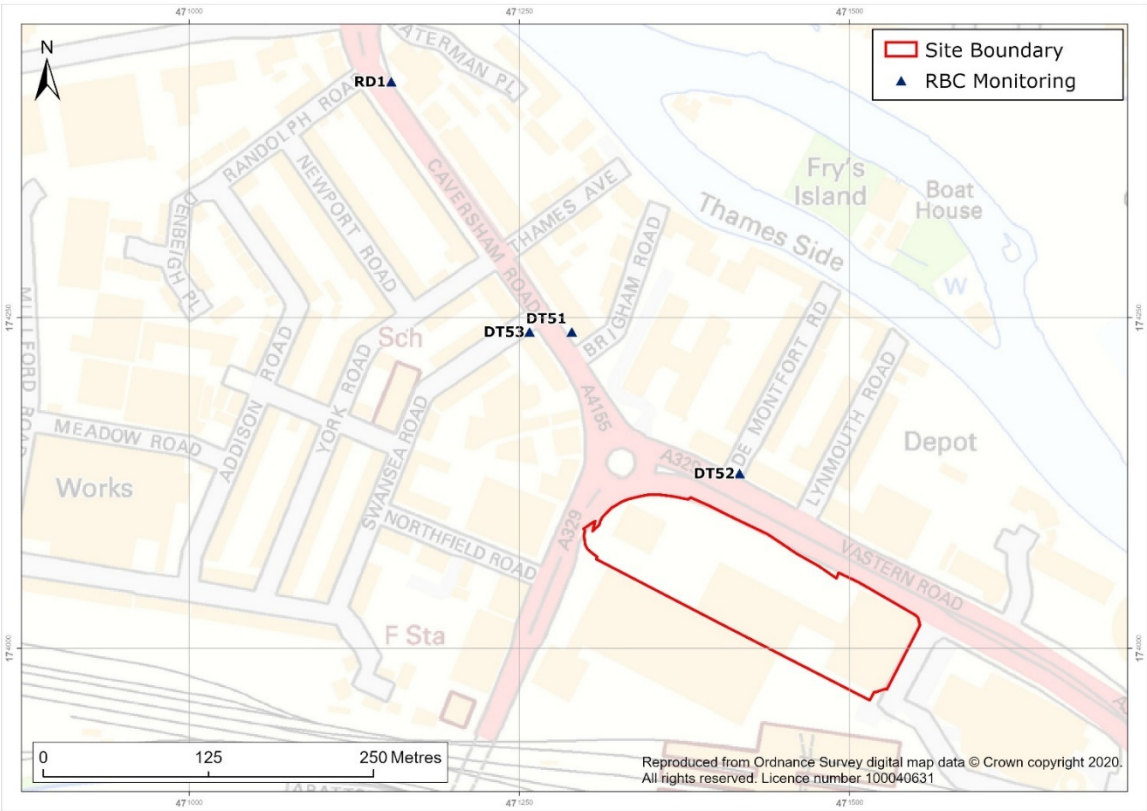


Figure 7.2: Air Quality Monitoring Locations

7.60 The results of NO₂ hourly mean (short-term) measured exceedances are presented in Table 7.7.

Table 7.7: Measured Exceedances of Hourly Mean NO ₂ Objective					
Site ID	Number of Hours >200 (µg/m ³)				
	2014	2015	2016	2017	2018
RD1	0	1	0	0	7
Objective	18 (200)				

7.61 The results of the PM₁₀ monitoring at RD1 monitoring site are shown in Table 7.8. There is no PM_{2.5} monitoring undertaken in close proximity to the application site.

Table 7.8: Measured PM ₁₀ concentrations					
Site ID	2014	2015	2016	2017	2018
Annual mean (µg/m³)					
RD1	33	28	20	23	24
Objective	40				
Number of 24-hours exceeding 50 (µg/m³)					
RD1	31(51)	8(41)	5	7	3
Objective	35				
Notes:					
If the period of valid data is less than 85 %, the 90.4 th percentile of 24-hour means is provided in brackets.					

Assessment of Monitoring Data

- 7.62 Measured NO₂ concentrations at the closest monitoring site to the application site, DT52 Vastern Road, have been below the objectives between 2015-2018.
- 7.63 Measured NO₂ concentrations at the automatic site RD1 Caversham Road have been above or within 10 % of the annual mean objective for the past five years. No exceedances of the 1-hour mean objective have been reported in the past five years. NO₂ concentrations at DT51 Caversham Road have been above the objective for the past five years, while at DT53 (across the road) concentrations have been below the objective between 2016-2018. The variation in measured concentrations along Caversham Road is likely to be due to the prevailing wind direction and the canyon effect created by the building arrangements, which creates recirculation regions and limits pollutant dispersion.
- 7.64 Measured PM₁₀ concentrations have been well below the annual and 24 hour mean objectives.
- 7.65 There is no clear trend in concentrations over time for both NO₂ and PM₁₀ concentrations. However, for all monitoring sites, lower annual mean concentrations were recorded in 2018 compared with those recorded in 2014.
- 7.66 NO₂ concentrations at the application site would be expected to be similar to measured concentrations at DT52, i.e. the application site is likely to meet the relevant air quality objectives. Measured concentrations along Caversham Road are expected to be higher than the anticipated concentrations at the application site and measured concentrations along Vastern Road due to higher traffic flows and building configurations. Some variation in NO₂, PM₁₀ and PM_{2.5} concentrations would be expected across the application site, with the highest concentrations close to the road links due to the emissions from road traffic.

Background Maps

- 7.67 Background concentrations are those levels that would be observed away from specific sources such as roads and industry. Defra provides modelled predictions of background concentrations of air pollutants over the whole of the UK with a grid resolution of 1 km². Table 7.9 details the NO₂, PM₁₀ and PM_{2.5} background levels at the application site for 2018.
- 7.68 Mapped background concentrations were calibrated against background concentrations measured at the Reading New Town Automatic Urban and Rural (AURN)²⁴ monitoring site (see ES Volume 3: Technical Appendix 7.2 for more details).
- 7.69 The background concentrations are all well below the relevant objectives.

Table 7.9: DEFRA 2018 Background Mapping (µg/m ³)				
Year	Grid Reference (x, y)	NO ₂	PM ₁₀	PM _{2.5}
2018	471500, 174500 ^a	25.8	13.1	7.1
	471500, 173500 ^b	30.7	12.6	6.7
Objective		40	40	25
Notes: a: Monitoring sites, existing receptors and application site (excluding b); b: south-west corner of the application site.				

Future Baseline

- 7.70 Despite the Department of Transport²⁵ estimated traffic growth on the transport network between 2019-2025 (without the proposed development in place), air quality at background and roadside locations is expected to gradually improve in future years due to the renewal of the vehicle fleet with lower emission factors. National policies, such as the intention to ban new combustion engine private vehicle sales by 2040, would hasten and enforce this process.
- 7.71 As per the Temporal Scope (paragraph 7.18), construction of the first plot is expected to be to be completed in 2022. Based on the above, the future baseline air quality at this date in the absence of the proposed development would be expected to be broadly similar or slightly improved when compared with the existing situation.
- 7.72 Table 7.10 presents details the NO₂, PM₁₀ and PM_{2.5} background levels at the application site for 2022. The background concentrations are all well below the relevant objectives and confirm a predicted decrease in background concentrations between 2018 and 2022.

Table 7.10: DEFRA 2022 Background Mapping (µg/m ³)				
Year	Grid Reference (x, y)	NO ₂	PM ₁₀	PM _{2.5}
2022	471500, 174500 ^a	22.7	12.5	6.8
	471500, 173500 ^b	26.7	12.0	6.3
Objective		40	40	25
Notes: a: Monitoring sites, existing receptors and application site (excluding b); b: south-west corner of the application site.				

Existing Sensitive Receptors

- 7.73 The application site is located in a populated area, with numerous sensitive receptors located in the immediate vicinity of the application site. Sensitive receptors were chosen to reflect places where members of the public would receive relevant exposure to annual mean and hourly pollutant concentrations from vehicle emissions. When identifying these receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links. The receptors identified as being sensitive to the proposed development and which have been 'scoped-in' to the assessment are summarised Table 7.11 and displayed on Figure 7.3. Receptor locations were modelled at a height of 1.5 m representing exposure at ground floor level.

Table 7.11: Summary of Sensitive Receptors				
Receptor ID	Location	X (m)	Y(m)	Sensitivity
R1	106 Caversham Road	471300	174228	High (residential)
R2	119 Caversham Road	471284	174205	
R3	Flat Above 99-113 Caversham Road	471296	174160	
R4	Flat above 97-111 Caversham Road	471294	174143	
R5	17 Vastern Road	471376	174154	
R6	31-51 Vastern Road	471438	174121	
R7	29 Vastern Road	471407	174137	

²⁵ Department of Transport (2019). Trip End Model Presentation Program (TEMPro).

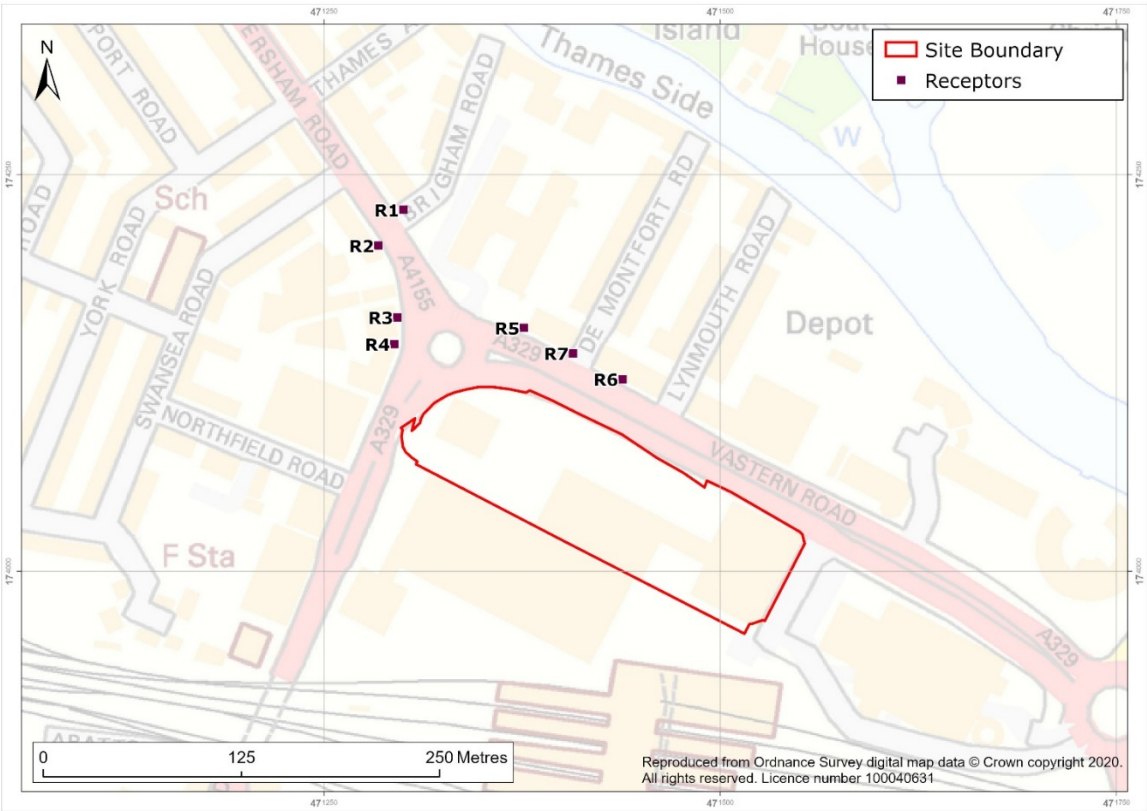


Figure 7.3 Air Quality Receptor Locations

Future Sensitive Receptors

- 7.74 The proposed development would be sequenced across the application site. Therefore it is likely that Building A could be occupied in advance of the completion of Buildings B, C and D. Were this to occur, Buildings B and C would be at an advanced stage of construction/ fit out such that significant dust emissions would be unlikely. These buildings would also by virtue of their massing, provide protection and screening from on-going works at Building D, which would be delivered in the final phase. Likewise, occupants of Buildings B and C would not be significantly affected by Building D works as these would be at an advanced stage, limiting the potential for significant dust effects. Accordingly, on-site residential receptors have not been considered within the demolition and construction assessment.
- 7.75 To assess the application site suitability for the proposed development, concentrations were predicted for a regular grid resolution of 10 x 10 m across the study area in order to present a contour of the annual mean concentrations geographically on a map (shown in Figure 7.4). The contours were modelled at a height of 1.5 m and 4.5 m representing exposure at ground floor and first floor level.

Assessment of Effects

Demolition and Construction Effects

- 7.76 In the absence of mitigation, there are three potential significant sources of emissions that could affect air quality during demolition and construction stage:
 - coarse and fine dust from construction activities including:
 - demolition of existing structures;
 - earthworks and site preparation;
 - construction of building structures, including foundations, which may include piling;
 - materials handling such as storage of materials in stockpiles and spillage;

- construction of on and off-site highway improvements; and
 - hard and soft landscaping and open space. demolition, excavation, earthmoving, materials storage and movement of construction vehicles.
- exhaust emissions from demolition and construction related traffic; and
- construction plant, both mobile and stationary (e.g. cranes and generators), which emit a mixture of exhaust gases.
- 7.77 There are numerous off-site residential properties within 350 m of the application site and within 50 m of the routes proposed to be used by construction traffic, thus using the IAQM guidance, a detailed assessment of demolition and construction dust impacts is required.
- 7.78 Dust impacts would be greatest in dry weather following long periods without rain and with the wind blowing towards sensitive receptors. Depending on wind speed and turbulence it is likely that the majority of dust will be deposited within 100 m of the source. Meteorological data from Farnborough Station (Volume 3 Technical Appendix 7.2), suggests that prevailing winds are typically south-westerly.
- 7.79 Using the evaluation criteria within the IAQM's Guidance, the potential dust emission magnitude has been identified for each stage of the proposed development as shown in Table 7.12 based on information presented in ES Chapter 5: Demolition and Construction Environmental Management.

Table 7.12: Dust Emission Impact Magnitude for Proposed Development Works		
Activity	Dust Emission Magnitude	Justification
Demolition	Small	Demolition works are anticipated to be delivered in four phases with total building volume per phase expected to be less than 20,000 m³.
Earthworks	Large	Total site area greater than 10,000 m².
Construction	Large	The development would have a total estimated construction volume of over 100,000 m³.
Trackout	Medium	It is assumed that maximum HDV movements over the course of the development would be between 10-50 HDV outward movements per day. This range is typical for a development of this size. Unpaved road length would be between 50-100 m.

- 7.80 The closest sensitive receptors to construction activity within 350 m of the application site would be residential properties along Vastern Road and Caversham Road. The residential properties are considered to be a high sensitivity receptor.
- 7.81 The next stage of the process is to define the sensitivity of the assessment area to dust soiling and human health impacts. This process combines the sensitivity of the receptor with the distance from the source to determine the overall sensitivity. The sensitivity of the area to dust impacts (taking into account distance to construction activity) is provided in Table 7.13.

Table 7.13: Sensitivity of Study Area to Dust Impacts	
Sensitivity to Dust Soiling	Sensitivity to Human Health Impacts
Medium: between 10 - 100 existing residential receptors located within 50 m of the application site; partial operating retail park during phased demolition works; and first occupants within the application site overlapping with demolition and construction phases.	Low: 10 - 100 residential properties within 20 m of the site boundary and its trackout routes. PM10 concentrations from local roadside monitoring was 24 µg/m³ in 2018 (RD1, see Table 7.8). However, concentrations at the application site are expected to be lower at the time phase 1 demolition begins and during construction (Q2 of 2021 to 2022; see Figure 7.4).

Table 7.13: Sensitivity of Study Area to Dust Impacts	

7.82 The dust emission magnitude determined in Table 7.12 has been combined with the sensitivity assessment in Table 7.13 to define the risk of impacts for each stage of the proposed development works in the absence of mitigation, as shown in Table 7.14.

Table 7.14: Risk of Dust Impacts in the Absence of Mitigation at Proposed Development				
Sensitivity of Study Area	Dust Emission Magnitude for Each Stage			
	Demolition (Small)	Earthworks (Large)	Construction (Large)	Trackout (Medium)
Dust Soiling (Medium)	Low Risk	Medium Risk	Medium Risk	Low Risk
Human Health (Low)	Negligible	Low Risk	Low Risk	Low Risk

7.83 Overall, without mitigation, the highest risk of dust soiling impacts is likely to be medium for earthworks and construction activities. The risk of human health effects from PM₁₀ is likely to be low for earthworks, construction and trackout activities. In accordance with the IAQM guidance, mitigation measures associated with the highest level of risk should be applied, i.e. a medium-risk site.

Embedded Mitigation and Standard Good Practice

7.84 The control of dust and construction traffic emissions from a construction site relies upon good site management and mitigation techniques to reduce emissions of dust and limit dispersion. A summary of the mitigation measures recommended in the IAQM guidance to reduce impacts from high risk sites is provided in Table 7.15 and in Chapter 5: Demolition and Construction Management (Table 5.7), which also includes mitigation measures to minimise impacts from HDV traffic and non-road mobile machinery (NRMM) associated with the construction works on the application site. The mitigation measures for both direct impacts and those from traffic would be detailed within the application site's CEMP, which would be secured by means of an appropriately worded planning condition.

Table 7.15: Recommended Dust Mitigation Measures for Medium Risk Sites	
Phase	Mitigation Measure
Communications	- Develop and implement a stakeholder communications plan. - Display the name and contact details of persons accountable on the site boundary. - Display the head or regional office information on the site boundary.
Management	- Develop and implement a dust management plan. - Record all dust and air quality complaints, identify causes and take measures to reduce emissions. - Record exceptional incidents and action taken to resolve the situation. - Carry out regular site inspections to monitor compliance with the dust management plan and record results. - Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken. - Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible. - Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site.

Table 7.15: Recommended Dust Mitigation Measures for Medium Risk Sites	
Phase	Mitigation Measure
	- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. - Avoid site run off of water or mud. - Keep site fencing, barriers and scaffolding clean using wet methods. - Remove potentially dusty materials from site as soon as possible. - Cover, seed or fence stockpiles to prevent wind whipping. - Ensure all vehicles switch off engines when stationary. - Avoid the use of diesel or petrol powered generators where possible. - Produce a Construction Logistics Plan to manage the delivery of goods and materials. - Only use cutting, grinding and sawing equipment with dust suppression equipment. - Ensure an adequate supply of water on site for dust suppressant. - Use enclosed chutes and conveyors and covered skips. - Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate. - Ensure equipment is readily available on site to clean up spillages of dry materials. - No on-site bonfires and burning of waste materials on site.
Demolition	- Incorporate soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). - Ensure water suppression is used during demolition. - Avoid explosive blasting, using appropriate manual and mechanical alternatives. - Bag and remove any biological debris or damp down such material before demolition.
Earthworks	- Re-vegetate earthworks and exposed areas /soil stockpiles to stabilise surfaces as soon as practicable. - Only remove the cover in small areas during work and not all at once.
Construction	- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process. - Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored silos with suitable emissions control systems.
Trackout	- Use water assisted dust sweepers on the site access and local roads. - Avoid dry sweeping of large areas. - Ensure vehicles entering and leaving the site are covered to prevent escape of materials. - Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable. - Install hard surfaced haul routes which are regularly damped down. - Install a wheel wash with a hard-surfaced road to the site exit where site layout permits. - The site access gate to be located at least 10 m from receptors where possible.

Significance of Demolition and Construction Stage Effects

7.85 The IAQM guidance recommends that no assessment of the significance of demolition and construction stage effects is made without mitigation in place. With the implementation of the CEMP and Chapter 5: Demolition and Construction Management measures, the construction and demolition dust and vehicle emissions effects in the area are considered to be temporary and not significant.

Completed Development Effects

Embedded Mitigation

- 7.86 As part of the Applicant's commitment to ensure an appropriate development response, the Applicant and the design team have developed a number of measures within the development proposals to ensure that the potential for adverse effects are avoided.
- 7.87 An Energy Statement is submitted accompanying the application, demonstrating how the proposed development would reduce the energy consumption, and related emissions, incorporating energy efficiency measures. The proposed development's heating system is a water to water based heat pump system and no combustion plant being proposed as part of the development.
- 7.88 The proposed development would provide 10 % of the application site area for open space ensuring that the landscape strategy delivers a high quality public realm. The landscape masterplan would provide green infrastructure which would assist in reducing particulate concentrations.
- 7.89 The proposed development has been set-back approximately 6 m from Caversham and Vastern Road kerbside, which is the main source of air pollution for the potential future residents.

Existing Sensitive Receptors

- 7.90 Emissions from road traffic are the major contributor to poor air quality in urban areas within the UK and contribute to exceedance of the AQOs in close proximity to the application site.
- 7.91 The results of the dispersion modelling at existing receptors as a result of the completed proposed development are shown in Table 7.16 to Table 7.18.

Table 7.16: Predicted Annual Mean NO ₂ at Existing Receptors (µg/m ³)					
Receptor	Future Base + Cumulative	Future Base + Cumulative + Proposed Development	Development Traffic Contribution	% Change in concentration relative to Assessment Level (AQAL)	Impact Descriptor
R1	32.3	32.1	-0.2	-0.5%	Negligible
R2	33.2	33.0	-0.3	-0.6%	Negligible
R3	31.1	30.8	-0.3	-0.8%	Negligible
R4	32.1	31.7	-0.4	-0.9%	Negligible
R5	31.7	32.7	1.0	2.5%	Slight Adverse
R6	30.5	31.6	1.1	2.7%	Slight Adverse
R7	31.0	31.8	0.8	1.9%	Slight Adverse
Objective	40		-		

Table 7.17: Predicted Annual Mean PM ₁₀ at Existing Receptors (µg/m ³)					
Receptor	Future Base + Cumulative	Future Base + Cumulative + Proposed Development	Development Traffic Contribution	% Change in concentration relative to Assessment Level (AQAL)	Impact Descriptor
R1	14.4	14.4	0.0	-0.1%	Negligible

Table 7.17: Predicted Annual Mean PM ₁₀ at Existing Receptors (µg/m ³)					
Receptor	Future Base + Cumulative	Future Base + Cumulative + Proposed Development	Development Traffic Contribution	% Change in concentration relative to Assessment Level (AQAL)	Impact Descriptor
R2	14.6	14.5	-0.1	-0.1%	Negligible
R3	14.2	14.1	-0.1	-0.2%	Negligible
R4	14.3	14.3	-0.1	-0.2%	Negligible
R5	14.3	14.4	0.2	0.5%	Negligible
R6	14.0	14.2	0.2	0.5%	Negligible
R7	14.1	14.3	0.1	0.3%	Negligible
Objective	40		-		

Table 7.18: Predicted Annual Mean PM _{2.5} at Existing Receptors (µg/m ³)					
Receptor	Future Base + Cumulative	Future Base + Cumulative + Proposed Development	Development Traffic Contribution	% Change in concentration relative to Assessment Level (AQAL)	Impact Descriptor
R1	7.7	7.7	-0.03	-0.1%	Negligible
R2	7.8	7.8	-0.03	-0.1%	Negligible
R3	7.5	7.5	-0.04	-0.2%	Negligible
R4	7.6	7.6	-0.04	-0.2%	Negligible
R5	7.6	7.7	0.1	0.4%	Negligible
R6	7.5	7.6	0.1	0.5%	Negligible
R7	7.5	7.6	0.1	0.3%	Negligible
Objective	25		-		

- 7.92 The predicted NO₂, PM₁₀ and PM_{2.5} concentrations in 2025 without and with the proposed development in place are below the relevant objectives at all assessed existing receptor locations.
- 7.93 The changes in annual mean NO₂ range from a maximum reduction of approximately 0.9 % along Caversham Road (receptor R4) to a maximum increase of approximately 2.7 % along Vastern Road (receptor R6). The changes in annual mean PM₁₀ and PM_{2.5} would be ±1 % for all receptors.
- 7.94 The proposed development would replace the current existing retail park triggering a net reduction of vehicle flows on the road network surrounding the proposed development and causing a pollutant concentrations reduction along Caversham Road. The proposed development massing and height may create a localised canyon like effect at Vastern Road which would affect pollutant dispersion and is predicted to cause a pollutant concentration increase at the assessed receptors along Vastern Road.
- 7.95 The predicted annual mean NO₂ concentrations for all receptors are predicted to be well below 60 µg/m³. This indicates that the hourly mean objective is unlikely to be exceeded at outdoor locations of these receptors where the hourly mean would apply. None of the predicted annual mean PM₁₀ concentrations exceed 32 µg/m³ and therefore the 24-hour mean PM₁₀ objective is not predicted to be exceeded.

7.96 The impact on annual mean NO₂ concentrations is described as **Slight Adverse** at receptors along Vastern Road (R5 to R7), as outlined in Table 7.5. The impact on annual mean NO₂ concentrations is described as **Negligible** at receptors along Caversham Road (R1 to R4), as outlined in Table 7.5, with an overall improvement in air quality along this road. Overall, considering the conservative nature of the assessment, combining 2022 emission factors and backgrounds with 2025 traffic data, and the IAQM criteria for assessing significance, the air quality effects of the proposed development on existing receptors is considered to be permanent and **Not Significant**.

Proposed Development Future Receptors

- 7.97 Existing (or projected) air quality could impact the occupants of the proposed development, through the introduction of new sensitive receptors into an area of poor air quality.
- 7.98 The suitability of the application site for the proposed development and the need for mitigation has been assessed against the annual mean NO₂ objective of 40 µg/m³ as this is the objective most likely to be breached. Figure 7.4 shows the annual mean NO₂ contour for 40 µg/m³ and 36 µg/m³ (within 10 % of the objective) for the completed development modelled at 1.5 m height to represent ground floor exposure. The 40 µg/m³ contour is limited to the road and only intersects the application site boundary on the western site access on Caversham Road, where there would be no residential receptors. The 36 µg/m³ contour intersects the application site boundary and the façade of the plots along Vastern Road.
- 7.99 The application site is compliant with the PM₁₀ and PM_{2.5} AQOs and therefore these have not been shown.
- 7.100 The predicted NO₂, PM₁₀ and PM_{2.5} concentrations at the application site with proposed development in place are below the relevant objectives at all floor levels. The application site is suitable for the proposed development without the need for mitigation.

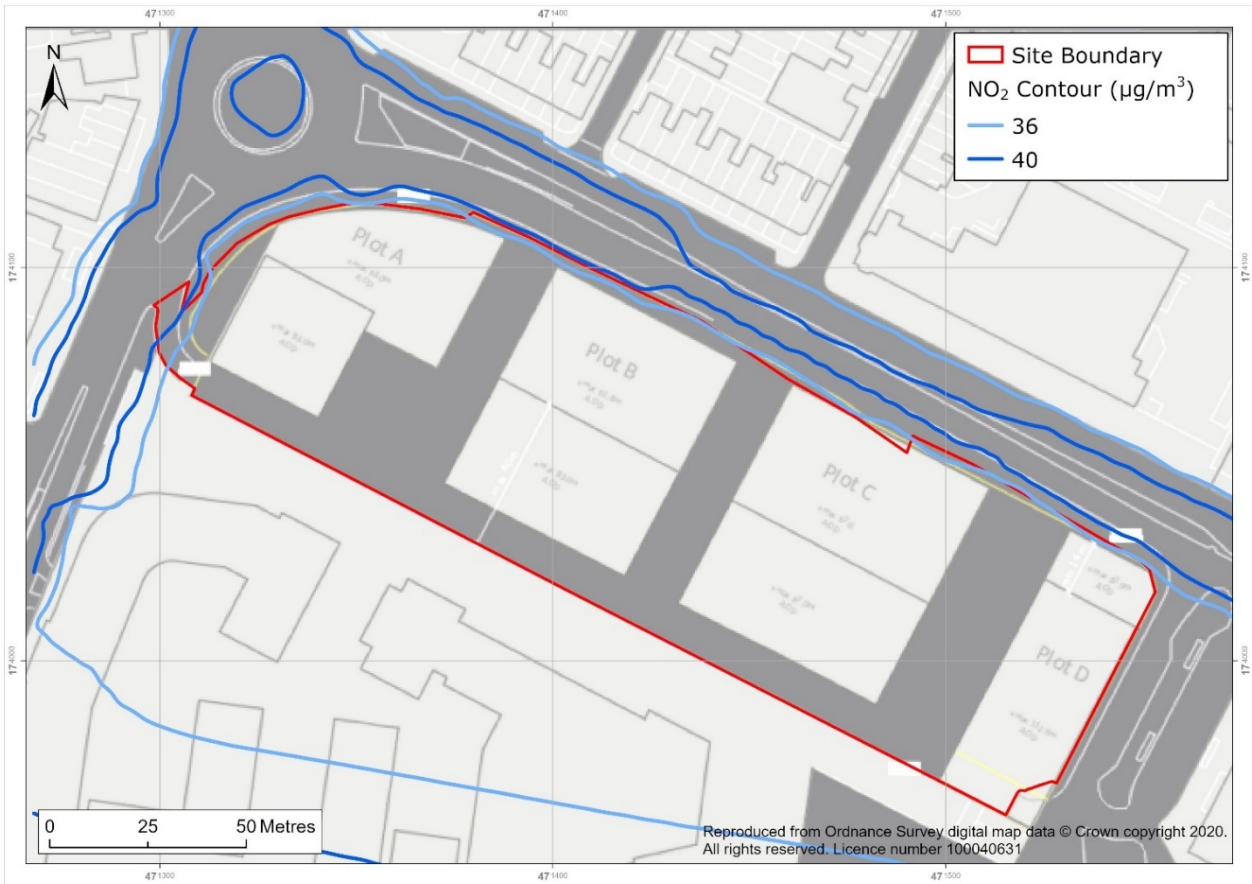


Figure 7.4: Predicted Concentrations at Proposed Development

Assessment of Residual Effects

Additional Mitigation

7.101 No additional mitigation is required.

Enhancement Measures

7.102 No enhancement measures are proposed in respect of air quality.

Demolition and Construction Residual Effects

7.103 With appropriate mitigation in place the residual effect of demolition and construction effects remain as reported in the assessment of effects section; Negligible and not significant.

Completed Development Residual Effects

- 7.104 At existing receptors the proposed development results in a **Slight Adverse** effect on air quality which is direct and permanent, but which is overall considered to be not significant.
- 7.105 Air quality objectives are expected to be met at on-site sensitive receptors during operation of the proposed development and therefore result in a direct and permanent negligible effect on air quality which is not significant.

Summary of Residual Effects

7.106 The residual air quality effects are summarised in Table 7.19.

Table 7.19: Summary of Residual Air Quality Effects								
Receptor	Residual Effect	Additional Mitigation	Nature of Residual Effect*					
			Scale of Effect **	+ -	D I	P T	R IR	St Mt Lt
Demolition and Construction								
Existing Off-site Human Health and Amenity	Dust Soiling and PM ₁₀ due to demolition and construction works	None required	Negligible	+/-	D	T	R	Mt
Existing Off-site Human Health	NO ₂ , PM ₁₀ and PM _{2.5} due to vehicle emissions	None required	Negligible	+/-	D	T	R	Mt
Completed Development								
Existing Off-site Human Health	NO ₂ , PM ₁₀ and PM _{2.5} effects due to vehicle emissions	None required	Slight Adverse	-	D	P	IR	Lt
Future On-site Human Health and Amenity	NO ₂ , PM ₁₀ and PM _{2.5} effects due to local air quality	None required	Negligible	+/-	D	P	IR	Lt
Notes: * - = Adverse/ + = Beneficial/ +/- Neutral; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt –Medium term/ Lt –Long term. **Negligible/Minor/Moderate/Major								

7.107 None of the reported residual air quality effects would be significant.

Cumulative Effects

- 7.108 A review of potential cumulative schemes has been undertaken with reference to criteria listed in Chapter 2: EIA Process and Methodology. Table 7.20 provides a summary of the likely cumulative effects resulting from the proposed development and the cumulative developments.
- 7.109 Potential cumulative demolition and construction effects could occur should construction of cumulative schemes occur at the same time as the proposed development. Demolition and construction stages of approved cumulative schemes within 350 m of the proposed development are not expected to overlap with the demolition and construction stage of the proposed development.
- 7.110 Moreover, significant cumulative effects are unlikely to occur as each scheme is anticipated to employ similar dust mitigation techniques such that the individual construction stage effects are not significant, alone or in combination.
- 7.111 The future year traffic data included in the air quality model has taken into account future predicted traffic growth, as well as cumulative schemes in the area. The assessment has therefore predicted the cumulative concentrations arising from cumulative schemes in the area in 2025. No significant effects on air quality are anticipated as a result of the operation of the proposed development in combination with other cumulative schemes.

Table 7.20: Inter-Project Cumulative Effects				
Cumulative Development	Demolition and Construction		Operation / Completed Development	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Approved Projects (including Resolution to Approve)				
Former BMW Site – Thames Quarter	No.	No overlapping demolition and construction stages expected. Scheme anticipated to employ similar dust mitigation techniques as the proposed development.	No	Cumulative concentrations predicted and considered not significant.
Station Hill	No.	No overlapping demolition and construction stages expected. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Cumulative concentrations predicted and considered not significant.
Kenavon Drive; Land between Weldale Street and Chatham Street, Reading; and 52 to 55 Friar Street and 12 Greyfriars Road, Reading RG1 1DX	No.	Considerable distance between the proposed development and the cumulative schemes (over 350 m)	No	Cumulative concentrations predicted and considered not significant.
29 Station Road Reading, RG1 1LG	No.	No overlapping demolition and construction stages expected. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Cumulative concentrations predicted and considered not significant.
Reasonably Foreseeable Schemes				
Network Rail Thames Valley Area site office/ Former Royal Mail site	Unknown	The timeframes are unknown and there is potential for demolition and construction phases to overlap.	No	Proposed residential scheme with minimal traffic expected.

Table 7.20: Inter-Project Cumulative Effects				
Cumulative Development	Demolition and Construction		Operation / Completed Development	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
		Nevertheless, the scheme is anticipated to employ dust mitigation techniques similar to the proposed development and cumulative effects are unlikely.		
Former Scottish and Southern Energy site	Unknown	The application has not yet been submitted. The timeframes are unknown and there is potential for demolition and construction phases to overlap. Nevertheless, the scheme is anticipated to employ dust mitigation techniques similar to the proposed development and cumulative effects are unlikely.	Unknown	The application has not yet been submitted.
Broad Street Mall Broad Street Reading, RG1 7QG	No	Considerable distance between the proposed development and the cumulative schemes (over 350 m)	No	Cumulative concentrations predicted and considered not significant.