

Chapter 7: Air Quality

AIR QUALITY	
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SUPPORTING APPENDIX	ES Volume 3: Appendix Air Quality: Annex 1: Dust Risk Assessment Methodology; Annex 2: Air Quality Modelling Methodology.
KEY CONSIDERATIONS	RBC has declared the whole city centre as an Air Quality Management Area (AQMA) for likely exceedances of the annual mean objective for NO₂. The Proposed Development is therefore located within an AQMA. The principal source of pollutants in the borough is road traffic exhaust emissions; therefore, there is a risk of exceedances of the annual mean NO₂ objective in areas located close to major roads, including the site. Activities associated with the demolition and construction works of the Proposed Development will give rise to a risk of dust impacts at existing sensitive receptors during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. In terms of the potential air quality effects, the assessment will consider: - Construction activity generating dust and particulate matter impacting existing and proposed receptors, including on-site activity (works, machinery, vehicle movements) and potential off-site effects from trackout; and - Existing air quality impacting proposed new receptors, specifically NO₂, PM₁₀ and PM_{2.5}.
CONSULTATION	An EIA Scoping Report was prepared and submitted to the RBC in September 2018 requesting a formal Scoping Opinion from the RBC on the scope of the EIA. A copy of the EIA Scoping Report is provided in ES Volume 3: Appendix- EIA Scoping. A Scoping Opinion has not been received at the time of preparing this ES. The EIA has proceeded in the absence of a formal opinion received. A telephone conversation and email correspondence between Chris Rush (Associate, Hoare Lea) and Ross Jarvis (Senior Environmental Health Officer, RBC) on 28th June 2018.

ASSESSMENT METHODOLOGY

Defining the Baseline

Background

Local Air Quality Management

- 7.1
- Local Air Quality Management (LAQM) was introduced in Part IV of the Environment Act 1995 and requires every local authority to carry out regular review and assessments of air quality in its area.
- 7.2
- The local air quality is compared with air quality objectives, which are the policy targets set by the Government, taking account of economic efficiency, practicability, technical feasibility and timescale, where air quality standards are expected to be achieved by a certain date.
- 7.3
- Standards are the concentrations of pollutants in the atmosphere, below which there is a minimum risk of health effects or ecosystem damage; they are set with regard to scientific and medical evidence.
- 7.4
- Where an objective has not been, or is unlikely to be achieved, the local authority must declare an Air Quality Management Area (AQMA) and prepare an action plan which sets out appropriate measures to be introduced in pursuit of the objectives. The Air Quality Strategy, published by the Department for Environment, Food and Rural Affairs (Defra) sets out the air quality standards and objectives intended to protect human health and the environment.

¹ European Parliament, Council of the European Union (2018) 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 Reading Borough Council (2016) Air Quality Annual Status Report

³ Defra (2018) UK-AIR: Air Information Resource <http://uk-air.defra.gov.uk/>

Table 7.1 The Objectives for NO₂, PM₁₀ and PM_{2.5}

Pollutant	Concentration Measured As	Objective
NO ₂	1-hour Mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m ³
PM ₁₀	24-hour Mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³
PM _{2.5}	Annual Mean	25 µg/m ³

Defra Modelled Roadside concentrations

- 7.5
- The models are used to identify current exceedances of the annual mean NO₂ European Union's (EU) limit value (there are no exceedances of the PM₁₀ limit values);
- 7.6
- Limit values are legally binding ambient pollutant concentrations set out in the EU's Directive on ambient air quality and cleaner air for Europe¹. Achievement of the limit values is a national obligation rather than a local one. The limit values are the same as the objective values (see Table 7.1); however, the compliance dates differ, and the limit values apply at all locations (apart from where the public does not have access, where health and safety at work provisions apply and on the road carriageway). The PM₁₀ and NO₂ limit value applied from 2005 and 2010 respectively, whereas the PM_{2.5} limit value applied from 2015.

Current Baseline Conditions

- 7.7
- Information on existing air quality has been collated from the following sources:
- The results of local monitoring and the LAQM review and assessment reports undertaken by Reading Borough Council (RBC)²;
 - The LAQM objectives for nitrogen dioxide (NO₂) and fine particulate matter less than 10 micrometers in diameter (PM₁₀) are shown in Table 7.1. The objectives for PM₁₀ and NO₂ were to have been achieved by 2004 and 2005 respectively, and continue to apply in all future years thereafter. The objective for fine particulate matter less than 2.5 micrometers in diameter (PM_{2.5}), also shown in Table 7.1, is to be achieved by 2020; however, there is no obligation for local authorities to try to meet the PM_{2.5} objective.
 - As part of LAQM, local authorities measure air quality using automatic monitors and diffusion tubes. This data has been used to determine the existing air quality.
 - Maps of modelled roadside concentrations published by Defra³;
 - Background nitrogen oxides, NO₂, PM₁₀ and PM_{2.5} pollutant concentration maps published by Defra⁴:
 - These maps cover the whole country on a 1 x 1 km grid;
 - Defra's Pollutant Release and Transfer Register⁵:
 - Used to screen for local industrial and waste management sources within 200m of the site.

Evolution of the Baseline / Do Nothing Scenario

- 7.8
- The opening year background air quality has been determined based on background pollution concentration maps published by Defra. Future baseline concentrations have been predicted using the ADMS Roads dispersion model. Traffic data for the 'Future Baseline (Do Nothing)' scenario was used.

Impact Assessment Methodology

Demolition and Construction

- 7.9
- A construction dust risk assessment has been undertaken in accordance with the methodology in the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction⁶.

⁴ Defra (2018) Local Air Quality Management (LAQM) Support <http://laqm.defra.gov.uk/>

⁵ Defra (2018) UK PRTR <https://www.gov.uk/guidance/uk-pollutant-release-and-transfer-register-prtr-data-sets>

⁶ IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction

7.10 The guidance divides activities on construction sites into four main types: demolition, earthworks, construction and trackout. The methodology is based on a sequence of steps.

- Step 1 screens the requirement for more detailed assessment:
 - if there are no receptors within 350 m of the site boundary, or within 50 m of roads used by construction vehicles, then no further assessment is required;
- Step 2 assesses the risk of dust impacts from each of the four activities:
 - Takes into consideration the scale and magnitude of the works, and the sensitivity of the area;
- Step 3 determines site-specific mitigation for each of the four activities; and
- Step 4 determines whether significant effects are likely; however, with appropriate mitigation in place, the residual effect will normally be 'not significant'.

7.11 Full details of the construction dust assessment methodology can be found in **ES Volume 3: Appendix Air Quality - Annex 1**.

7.12 The IAQM construction dust guidance advises that exhaust emissions from on-site plant and traffic are unlikely to make a significant impact on local air quality, and that in the vast majority of cases, will not need to be quantitatively assessed.

7.13 With regard to site traffic on the public highway, it is anticipated that the construction phase will lead to a maximum annual average daily increase of 21 heavy goods vehicles (HGV) and 19 light vehicles. Indicative criteria, used to determine the need to proceed to a detailed Air Quality Assessment due to road traffic emissions, are set out in Environmental Protection UK (EPUK) and IAQM guidance on Land-Use Planning & Development Control: Planning for Air Quality⁷.

7.14 It advises that detailed assessment of the air quality effects due to additional traffic should not be required where the increases in annual average daily HGV and light vehicle movements are less than 25 and 100 respectively, within an AQMA. Therefore, as the estimated HGV movements are less than the guidance threshold, the potential effects due to site traffic on the public highway during the construction phase are not considered further.

Completed Development

Energy Impacts

7.15 There will be no on-site energy provision and the development will be all electric (see **ES Volume 1: Chapter 4 - Proposed Development**); therefore, there will be no air quality effects due to the proposed energy strategy for the Proposed Development.

Road Traffic Impacts

Modelling Methodology

7.16 Concentrations have been predicted using the ADMS Roads (v4.1.1.0) dispersion model⁸. The model requires the input of a range of data, including traffic emissions (calculated from traffic data provided by the traffic consultants), road layouts and meteorological data. Full details of the data used in the model is provided in **ES Volume 3: Appendix Air Quality - Annex 2**.

Assessment Scenarios

7.17 Concentrations of NO₂, PM₁₀ and PM_{2.5} have been predicted at existing receptors for the following traffic scenarios:

- Scenario 1: Existing Baseline Scenario (2018⁹);
 - Existing / Surveyed to understand current prevailing conditions (2018) is the year of the most recent monitoring data published by RBC);

- Scenario 2: Future Baseline (Do Nothing¹⁰) (opening year 2022(see programme in **ES Volume 1: Chapter 5 - Demolition and Construction**);
 - Existing Baseline, plus planned growth from Committed Developments;
- Scenario 3: Future Baseline (Development¹¹) (opening year 2022);
 - Existing Baseline, plus planned growth from Committed Developments, plus Proposed Development.

Modelling Uncertainty

7.18 There are many factors that contribute to uncertainty when predicting pollutant concentrations. The emission factors utilised in the air quality model are dependent on predicted traffic data, which have inherent uncertainties associated with them, i.e., future traffic flows are predicted based on the scale of the development and anticipated traffic growth (including committed developments and the assumption of them being built) between the baseline year and the future assessment year.

7.19 There are also uncertainties associated with the model itself as it simplifies real world conditions into a series of algorithms. The model verification process, as described in **ES Volume 3: Appendix Air Quality - Annex 2** minimises the uncertainties related to baseline year (2018) predictions.

7.20 In general, future year predictions are subject to greater uncertainty, as projected traffic data, emissions data, and background concentrations are used. To reduce the degree of uncertainty, the most recent emission factors and background data published by Defra have been used in this assessment.

7.21 However, there are still uncertainties associated with the Defra¹² data. Analysis of the data has shown a disparity between historical monitoring data and the projected background concentrations published by Defra. Recent information suggests there is not much evidence of the consistent downward trend in NO₂ and NO_x concentrations presented by the emission inventory estimates.

7.22 This disparity is believed to have arisen due to the actual on-road performance of diesel vehicles when compared with emissions calculations based on the Euro standards and published in the Emissions Factor Toolkit (EFT) used for modelling⁴. Real-world emissions test results suggest that emissions from the most recent EFT (v9.0) accurately represent on-road emissions from the pre-2018 diesel fleet; however, there is still uncertainty with regard to how well post-2018 diesel cars and vans will perform in the real world¹³.

7.23 To account for this uncertainty a 'sensitivity analysis' has been undertaken for the future travel which assumes that there are no reductions in emission factors for road traffic from the baseline year. Details of the sensitivity analysis methodology are provided in **ES Volume 3: Appendix Air Quality – Annex 2**. The assumption that there are no emissions reductions from any vehicles (petrol and diesel) between 2018 and 2022 is highly conservative.

Methodology for Defining Effects

Demolition and Construction

7.24 There is the potential that in the absence of mitigation that the demolition and construction works would lead to dust soiling and elevated concentrations of PM₁₀. These impacts may also occur from trackout of dust onto the public highway, as vehicles leave the construction site.

7.25 The approach developed by the IAQM has been used for the assessment of dust⁶. The IAQM construction dust assessment methodology advises that, with appropriate mitigation in place, the residual effect from construction dust will normally be 'not significant'. The IAQM construction dust assessment has been used to determine an appropriate level of mitigation for the construction works described in **ES Volume 1, Chapter 5: Demolition and Construction**, corresponding with the size and scale of the site and the potential for adverse impacts arising from dust generated.

⁷ EPUK and IAQM (2017) Land-Use Planning & Development Control: Planning for Air Quality v1.2

⁸ CERC (2018) ADMS Roads <https://www.cerc.co.uk/environmental-software/ADMS-Roads-model.html>

⁹ Used as the last full year of air quality monitoring data

¹⁰ Without the implementation of the Proposed Development

¹¹ With the implementation of the Proposed Development – assuming full occupation

¹² Carslaw, D.C., Beevers, S.D., Westmoreland, E., Williams, M.L., Tate, J.E., Murrells, T., Stedman, J., Li, Y., Grice, S., Kent, A. and Tsagatakis, I. (2011) Trends in NO_x and NO₂ emissions and ambient measurements in the UK

¹³ AQC (2018) Development of the CURED V3A Emissions Model

Completed Development

Receptors and Receptor Sensitivity

- 7.26** Receptors have been identified at locations where members of the public are likely to be regularly present over the averaging period of the air quality objectives (see Table 7.1). Members of the public are considered to be high sensitivity receptors to air quality health effects. The objectives apply at receptor locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. Examples of where the objectives should apply are provided in the LAQM Technical Guidance TG.16 ¹⁴.
- 7.27** The annual mean NO₂ and PM₁₀ objectives should similarly apply at the building façades of residential properties, schools, hospitals, care homes etc.; they should not apply at the building façades of places of work, hotels, gardens or kerbside sites where members of the public will not be regularly exposed during the course of a year.
- 7.28** The 24-hour mean PM₁₀ objective should apply at all locations where the annual mean objective for PM₁₀ applies, as well as the gardens of residential properties and hotels, where members of the public may be exposed over 24-hours.
- 7.29** The 1-hour mean NO₂ objective should apply at all locations where the annual and 24-hour mean objectives apply, as well as at kerbside sites where the public have regular access, e.g. the pavements of busy shopping streets, where members of the public may be exposed over 1-hour.
- 7.30** The receptors identified for assessment have been located on the façades of properties closest to the road sources, paying particular attention to those located close to junctions, where traffic may become congested, and there is a combined effect from several road links.

Magnitude of Impact and Effect Scale

- 7.31** The approach suggested by EPUK and the IAQM in guidance on Land-Use Planning & Development Control: Planning for Air Quality⁷ has been used for this assessment. The air quality impacts have been described at each receptor by determining the percentage change in concentrations ¹⁵ relative to an air quality assessment level (AQAL) and comparing this with the total long-term average concentration, see Table 7.2 for further details.
- 7.32** For impacts on existing receptors, the AQALs for NO₂ and PM_{2.5} are based on the annual mean objectives (as shown in Table 7.1). The AQAL for PM₁₀ is an annual mean concentration of 32 µg/m³, as measured data show that the 24-hour PM₁₀ objective could be exceeded where annual mean concentrations are above 32 µg/m³ ¹⁴.

Table 7.2 Impact Descriptors for Individual Receptors

Long-term Average Concentration at Receptor in Assessment Year ^b	% Change in Concentration Relative to AQAL ^a			
	1	2-5	6-10	>10
≤ 75% of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
≥ 110% of AQAL	Moderate	Substantial	Substantial	Substantial

Notes:

a The % change rounded to a whole number. Changes of 0%, i.e. less than 0.5%, are described as negligible. The AQAL for NO₂ is 40µg/m³, the AQAL for PM₁₀ is 32µg/m³ and the AQAL for PM_{2.5} is 25µg/m³.

b The without scheme concentration where there is a decrease in predicted concentrations, and the with scheme concentration where there is an increase in predicted concentrations.

Effect Nature

- 7.33** The reference to 'effect' is described as beneficial if there is a decrease in concentrations and adverse if there is an increase in concentrations.

Geographic Extent of Effect

- 7.34** The geographic spatial extent of the effects is identified, including:

- Effects at 'site' or 'local' level are those affecting the site and neighbouring receptors,
- Effects upon receptors in the RBC beyond the vicinity of the site and its neighbours are at a 'district' level.
- Effects affecting Berkshire are at a 'regional' level, whilst those which affect different parts of the country, or England, are considered being at a 'national' level.

Effect Duration

- 7.35** For the purposes of the ES, effects that are generated as a result of the demolition and construction works are classed as 'temporary'; these may be further classified as either 'short term' or 'medium-term' effects depending on the duration of the works that generate the effect in question.
- 7.36** Effects that result from the completed and operational as of the Proposed Development are classed as 'permanent' or 'long-term' effects.

Categorising Likely Significant Effects

- 7.37** The air quality impact (i.e. the change in concentrations as a result of the Proposed Development) may have an effect on human health, dependent on the severity of the impact and other factors, as set out below.
- 7.38** The IAQM guidance advises that the overall effect of the air quality impacts should be judged as either significant or not significant. The judgement of significance should be made by a competent, suitably qualified professional. The overall judgement to determine whether the air quality impact is significant takes into account:
- The descriptions of the predicted impacts;
 - The existing and future (evolved baseline) air quality in the absence of the development;
 - The extent of current and future population exposure to the impacts;
 - The influence and validity of any assumptions adopted when undertaking the prediction of impacts;
 - The potential for cumulative impacts of the Proposed Development, i.e. several slight impacts taken together could have a significant effect, or a moderate or substantial effect confined to a small area and not obviously a cause of harm to human health could be described as not significant; and
 - The consequences of the impacts, i.e. will the impacts have an effect on human health that can be considered significant? The impacts from an individual development would usually not be large enough to result in a measurable change in health outcomes regarded as significant by healthcare professionals, and therefore the impact on local air quality is used as a proxy for assessing effects on human health.

Site Suitability

- 7.39** In order to assess the suitability of the site for residential use, additional receptors have been identified at locations within the site, where the impact from existing road traffic sources is likely to be greatest. Concentrations of NO₂, PM₁₀ and PM_{2.5} have been predicted at the new receptor locations in the anticipated opening year of 2022.
- 7.40** The level of potential impact experienced by new receptors introduced by the Proposed Development is determined based on whether an exceedance of an AQAL is predicted, or not.

For impacts on the new receptors at the Proposed Development a predicted exceedance of an AQAL will be considered as significant, unless provision is made to reduce the exposure by some other means. Predicted concentrations below the AQAL will be considered as insignificant.

¹⁴ Defra (2018) Local Air Quality Management Technical Guidance (TG16)

¹⁵ The modelled impact due to additional traffic plus the background concentration

RECEPTORS AND RECEPTOR SENSITIVITY

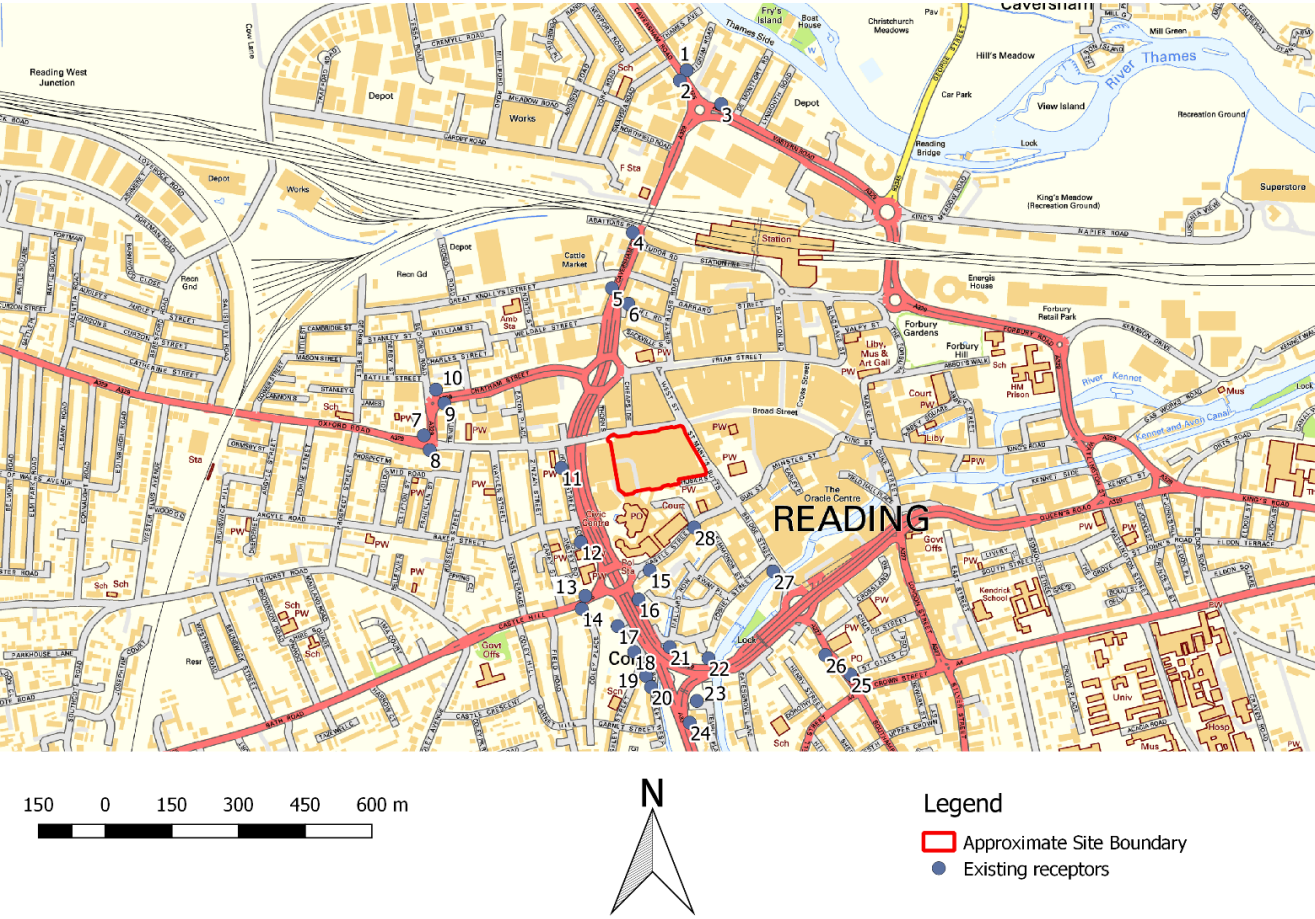
Existing Receptors

7.41 The existing receptors are described in Table 7.3 and shown in Figure 7.1.

Table 7.3 Description of Existing Receptors

Receptor	Location	X	Y	Z	Receptor Sensitivity
1	106 Caversham Road	471298	174230	1.5	High
2	119 Caversham Road	471283	174207	1.5	High
3	17 Vastern Road	471376	174154	1.5	High
4	59A Caversham Road	471177	173865	1.5	High
5	41 Caversham Road	471130	173740	1.5	High
6	Belmont Court	471167	173705	1.5	High
7	120 Oxford Road	470707	173409	1.5	High
8	165 Oxford Road	470720	173376	1.5	High
9	Cherwell Crescent	470753	173481	1.5	High
10	144 Chatham Street	470734	173512	1.5	High
11	2 Howard Street	471016	173336	1.5	High
12	6 Body Road	471060	173169	1.5	High
13	Castle Gate	471070	173048	1.5	High
14	97 Blenheim Terrace	471062	173019	1.5	High
15	1 Almshouses	471215	173106	1.5	High
16	Centenary House	471190	173040	1.5	High
17	Cheriton Court	471143	172980	1.5	High
18	Coley School	471180	172922	1.5	High
19	33 Wolseley Street	471207	172868	1.5	High
20	28 Brook Street West	471218	172843	1.5	High
21	New Bright Street 1	471260	172933	1.5	High
22	New Bright Street 2	471347	172908	1.5	High
23	45 Lower Brook Street	471321	172812	1.5	High
24	Temple Place	471305	172763	1.5	High
25	Southampton Street	471667	172871	1.5	High
26	Hamble Court	471610	172915	1.5	High
27	Riverside House	471493	173103	1.5	High
28	21 Castle Street	471315	173202	1.5	High

Figure 7.1 Location of Existing Receptors



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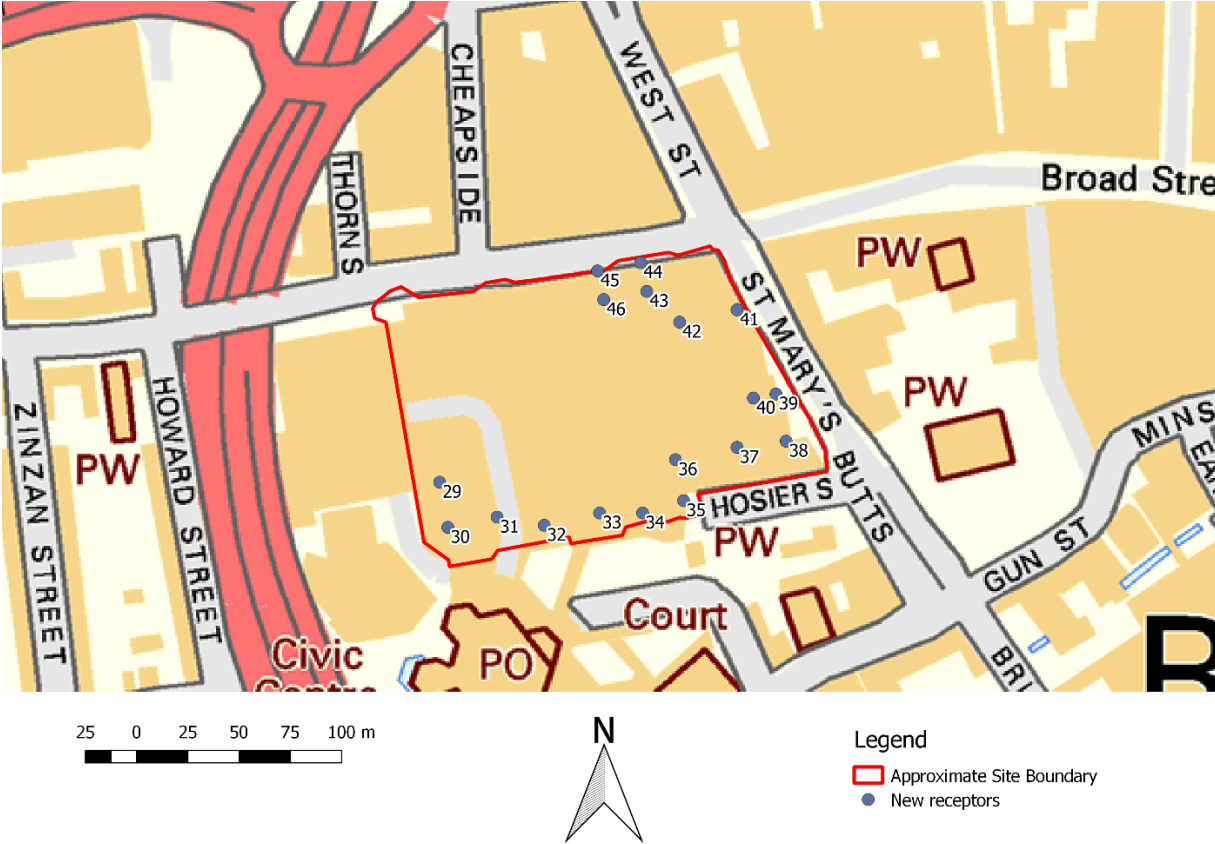
Site Suitability

7.42 The introduced onsite receptors are described in Table 7.4 and are shown in Figure 7.2.

Table 7.4 Description of New Receptors

Receptor	Location	X	Y	Z	Receptor Sensitivity
29	Block A	471153	173316	10.5	High
30	Block A	471157	173294	10.5	High
31	Block A	471181	173299	10.5	High
32	Block B	471204	173295	10.5	High
33	Block B	471231	173301	10.5	High
34	Block C	471252	173301	7.5	High
35	Block C	471272	173307	7.5	High
36	Block C	471268	173327	7.5	High
43	Block E	471254	173409	7.5	High
44	Block E	471251	173423	7.5	High
45	Block E	471230	173419	7.5	High
46	Block E	471233	173405	7.5	High

Figure 7.2 Location of Introduced Receptors (on-site)



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BASELINE CONDITIONS

Current Baseline Conditions

Industrial Sources

7.43 The search of the UK Pollutant Release and Transfer did not identify any industrial or waste management sources that are likely to affect air quality at the site or cause or in combination effects with the Proposed Development on surrounding existing receptors.

EU Limit Values

7.44 Urban background and urban traffic concentrations are measured at the continuous automatic monitoring sites Reading New Town Automatic Urban and Rural Network (AURN) and Reading London Road AURN respectively, which are located approximately 2.2 km to the east of the site (see Figure 7.3).

7.45 No exceedances of the EU limit value have been recorded at the Reading New Town or the London Road roadside monitoring sites (see Table 7.5 and Table 7.6).

Background Concentrations

7.46 Estimated background concentrations at the site in 2018 and 2022 are shown in Table 7.5. The background concentrations have been derived from data in the national maps published by Defra. The background concentrations are well below the objectives.

Table 7.5 Estimated Annual Mean Background Concentrations in 2018 and 2022 (µg/m³)

Year	NO ₂	PM ₁₀	PM _{2.5}
2018	27.7	16.2	11.2
2022	24.1	15.3	10.5
Objective	40	40	25

LAQM Review and Assessment

7.47 RBC has declared an AQMA for exceedances of the annual mean NO₂ objective across Reading town centre and along the major radial road routes into Reading, including along Oxford Road (A329). The site lies within the AQMA (Reading Town Centre).

7.48 In terms of PM₁₀, RBC has concluded from monitored data that there are no exceedances of the objectives anywhere in the borough; therefore, it is considered highly unlikely concentrations in the vicinity of the site exceed the objectives.

Local Air Quality Monitoring

7.49 As well as data from the Reading New Town and Reading London Road AURN monitoring sites. The results presented within Table 7.5, Table 7.6, Table 7.7 and Table 7.8 also show data from an automatic monitoring site operated by RBC on Caversham Road (A4155), approximately 1 km north of the site.

7.50 RBC also operates a number of diffusion tube monitoring sites. Measured annual mean NO₂ concentrations from diffusion tube monitoring sites located within 500 m of the site are shown in Table 7.5, and the monitoring locations are shown in Figure 7.3.

7.51 Measured annual mean concentrations of NO₂ at the automatic monitoring site on Caversham Road have been below the objective since 2015.

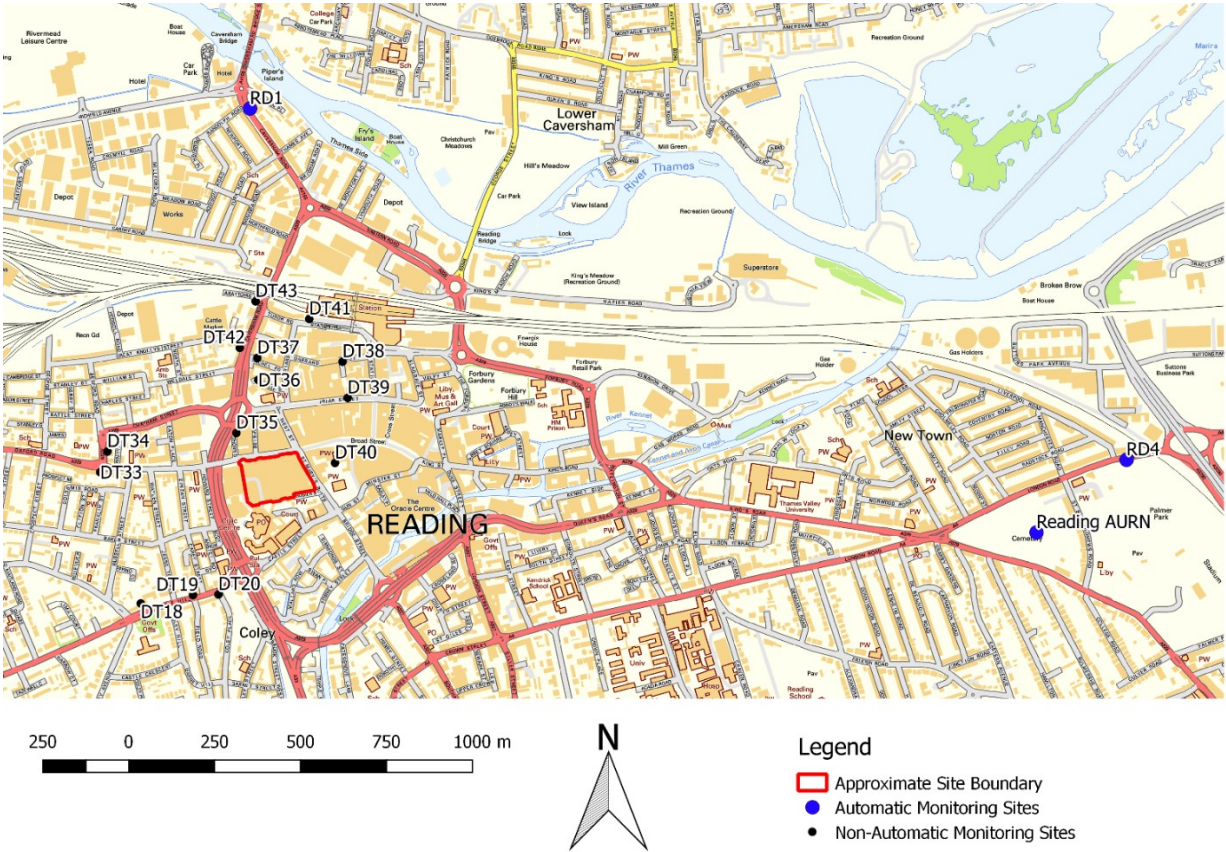
7.52 Annual mean NO₂ concentrations measured at diffusion tube monitoring sites have ranged from 29 µg/m³ to 55 µg/m³ between 2013 and 2018. Recent results indicate that the annual mean objective of 40 µg/m³ has been exceeded at five of the diffusion tube monitoring sites in 2018 (DT19, DT33, DT39, DT42 and DT43).

7.53 The compliance of the annual mean objective measured at diffusion tube monitoring sites in the town centre (locations DT 35 and DT40, closest proximity to the site) would indicate that there is unlikely to be an exceedances of the AQ Objective at the site.

7.54 No exceedances of the 1-hour NO₂ objective have been measured at any of the automatic monitoring sites.

7.55 No exceedances of the PM₁₀ or PM_{2.5} objectives have been measured at any of the automatic monitoring sites.

Figure 7.3 Air Quality Monitoring Sites



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Table 7.6 Monitor Results - Measured Annual Mean NO₂ Concentrations (2013 to 2018) ^a

Site ID	Location	Site Type	Annual Mean (µg/m³)					
			2013	2014	2015	2016	2017	2018
Automatic Monitor								
Reading AURN	Reading New Town (within Reading Cemetery)	UB	27	27	22	34	29	26
RD1	Caversham Road	R	43	41	38	39	36	40
RD4	London Road	R	-	-	-	32	30	30
Diffusion Tubes								
DT18	162a Castle Hill	R	39	40	36	37	35	35
DT19	128 Castle Hill	R	55	52	45	45	46	42
DT20	Blenheim Terrace	R	43	41	40	39	39	37
DT33	165 Oxford Road	R	48	51	47	44	47	42
DT34	10 Trinity Place	R	37	32	31	31	29	32
DT35	Picture House	R	34	34	30	32	30	31
DT36	Sackville Street	R	41	43	40	37	37	38
DT37	Vachel Street	R	36	38	33	35	34	35
DT38	Garrard Street	R	52	41	42	42	-	-
DT39	Friar Street	R	52	53	47	52	50	42
DT40	Station 1	R	-	-	-	47	49	33
DT41	Station 2	R	-	-	-	50	47	35
DT42	33 Caversham Road	R	49	51	48	43	45	44
DT43	59a Caversham Road	R	42	47	42	41	43	41
Objective			40 µg/m³					
Notes:								
a Exceedances are shown in bold / grey shaded. UB = urban background, R = roadside								

Table 7.7 Monitor Results - Exceedance for the 1-hour Mean NO₂ Objective (2013 to 2018) ^a

Table 11: Monitor Results Exceedance for the Annual mean PM_{10} Objective (2013 to 2018)								
Site ID	Location	Site Type	Number of Hours > 200 $\mu\text{g}/\text{m}^3$					
			2013	2014	2015	2016	2017	2018
Reading AURN	Reading New Town (within Reading Cemetery)	UB	0	0	0	4 (112)	0	0
RD1	Caversham Road	R	3	0	1	0	0	7
RD4	London Road	R	-	-	-	0	0	0
Objective			200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year					
Notes:								
a The number in parenthesis is the 99.79 th percentile, used where data capture is low. UB = urban background, R = roadside								

Table 7.8 Monitor Results - Summary of PM₁₀ Monitoring Data (2013 to 2018) ^a

Site ID	Location	Site Type	2013	2014	2015	2016	2017	2018
Annual Mean (µg/m³)								
Reading AURN	Reading Cemetery	UB	13	14	12	13	12	13
RD1	Caversham Road	R	34	33	28	20	23	24
RD4	London Road	R	-	-	-	19	18	17
Objective			40 µg/m³					
Number of Days > 50 µg/m³ ^a								
Reading AURN	Reading New Town (within Reading Cemetery)	UB	-	0	0	3	3	1 (24)
RD1	Caversham Road	R	34	31 (51)	8 (41)	5	7	3
RD4	London Road	R	-	-	-	2 (30)	3	1
Objective			50 µg/m³ not to be exceeded more than 35 times a year					
Notes:								
a The number in parenthesis is the 90.4 th percentile, used where data capture is low. UB = urban background, R = roadside								

Table 7.9 Monitor Results - Measured Annual Mean PM_{2.5} Concentrations (2013 to 2018) ^a

Site ID	Location	Site Type	2013	2014	2015	2016	2017	2018
Reading AURN	Reading New Town (within Reading Cemetery)	UB	10	10	7	9	10	7
Objective			25 µg/m³					
Notes:								
a UB = urban background,								

Modelled Baseline Concentrations

7.56 Baseline concentrations of NO₂, PM₁₀ and PM_{2.5} have been modelled at each of the existing receptor locations in Scenario 1 (existing baseline), Scenario 2 (future baseline (do nothing)) and Scenario 3 (future baseline (development)). The results are shown in Table 7.10. For the Existing Baseline the AQAL for NO₂ is predicted to be exceeded at nine receptors. For the Future Baseline (Development) scenario, the AQAL for NO₂ is achieved at all receptors in 2022. As described within the section 'Modelling Uncertainty' a sensitivity analysis has been undertaken for the Future Baseline (Do Nothing), which assumes no reduction in road traffic emission in the future. The results identify that there is some improvement in air quality; however, annual mean NO₂ concentrations remain above the objective at three receptors in 2022.

7.57 The AQALs for PM₁₀ and PM_{2.5} are predicted to be achieved at all receptors in 2018 and 2022.

Table 7.10 Predicted Baseline Concentrations in 2018 and 2022 ^a

Receptor	Annual Mean (µg/m³)					
	NO ₂		PM ₁₀		PM _{2.5}	
	2018	2022	2018	2022	2018	2022
1	38.5	32.0	22.4	21.6	15.1	14.3
2	38.2	31.7	22.2	21.3	15.0	14.2
3	39.4	32.6	21.9	21.0	14.8	14.0
4	40.6	34.0	21.1	20.3	14.1	13.3
5	44.3	36.8	22.1	21.2	14.7	13.8
6	38.7	32.6	20.4	19.5	13.7	12.9
7	39.0	31.7	20.8	19.8	14.2	13.3
8	33.9	27.9	19.3	18.4	13.3	12.5
9	39.1	32.1	21.1	20.1	14.3	13.5
10	30.2	25.2	18.3	17.4	12.6	11.9
11	37.1	31.4	20.0	19.1	13.4	12.7
12	37.3	31.4	20.0	19.2	13.4	12.7
13	42.9	35.8	22.1	21.2	14.7	13.8
14	40.5	34.0	21.2	20.3	14.1	13.3
15	36.3	30.6	19.3	18.5	13.1	12.3
16	44.2	36.9	22.9	22.1	15.2	14.3
17	30.6	25.6	19.9	19.1	13.6	12.9
18	32.0	26.5	19.9	19.1	13.7	12.9
19	30.3	25.2	19.2	18.4	13.3	12.6
20	29.4	24.5	19.0	18.2	13.2	12.5
21	40.5	32.9	22.3	21.4	15.2	14.3
22	35.2	28.9	20.7	19.8	14.2	13.4
23	32.4	26.8	19.9	19.1	13.7	13.0
24	35.4	29.2	21.7	20.9	14.7	14.0
25	36.8	30.1	21.5	20.6	14.6	13.8
26	31.3	26.0	20.1	19.4	13.8	13.1
27	33.0	28.1	18.1	17.2	12.3	11.6
28	35.0	29.5	18.8	17.9	12.7	12.0
AQAL	40		32		25	
Notes: a Exceedances are shown in bold / grey shaded.						

POTENTIAL EFFECTS

Demolition and Construction

Screening

7.58 There are the following receptors within the vicinity of the site:

- human receptors within 350 m of the site (north, east, south and west);
- receptors within 50 m of the route used by construction vehicles on the public highway, up to 500 m from the site entrance - further assessment of the construction phase impacts is required; and

- There are no sensitive ecological receptors within 50 m of the site and the impacts on ecology will not be considered further.

Risk of Dust Impacts

Potential Dust Emission Magnitude

7.59 The following classes are identified, based on the IAQM guidance definitions and thresholds (refer **ES Volume 3: Appendix Air Quality - Annex 1**), details of the demolition and construction works are taken from **ES Volume 1: Chapter 5 – Demolition and Construction**.

Demolition

7.60 Some demolition will take place within the Existing Mall to provide space for the cores for the towers. The volume of demolition will be less than 20,000 m³ and the works will be contained within the existing building. The dust emission class for demolition is considered to be small.

Earthworks

7.61 There will be no notable earthworks at the site (only small excavation for lift pits, approximately 60 m³) and the impacts will be contained within the basement, consequently earthworks will not be considered further.

Construction

7.62 The Proposed Development involves the construction of new buildings (total volume in excess of 100,000 m³). The construction will include piling and potentially the use of dusty construction materials (such as concrete). The dust emission class for construction is considered to be large.

Trackout

7.63 Peak vehicle movements are anticipated to occur during construction months 16 to 18 of, when there may be up to 20 outward heavy duty vehicle (HDV) movements from the site in a day. The dust emission class for trackout is considered to be medium.

7.64 A summary of the likely dust emission magnitudes is shown in Table 7.11.

Table 7.11 Likely Dust Emission Magnitudes

Source	Dust Emission Magnitude
Demolition	Small
Earthworks	N/A
Construction	Large
Trackout	Medium

Sensitivity of the Area

7.65 The sensitivity of the area depends on the specific sensitivities of local receptors, the proximity and number of receptors, local PM₁₀ background concentrations and other site specific factors, e.g. natural screening by trees.

Sensitivity of the Area to Dust Soiling

7.66 There are no highly sensitive receptors (residential) within 20m of the site; however, there are between 10-100 residential properties within 50m of the site. There are also commercial properties on site and within 20m of the site which would be considered medium sensitivity receptors (see Table A.2 in **ES Volume 3: Appendix Air Quality - Annex 1**). The area is thus considered to be of medium sensitivity to dust soiling.

7.67 Table 7.11 shows that the dust emission magnitude for trackout is medium; therefore, there is a risk of material being tracked up to 200 m from the site exit. There will be no highly sensitive residential receptors within 20m of roads along which material could be tracked; however there is medium sensitivity commercial properties. The area is thus considered to be of medium sensitivity to dust soiling from trackout.

Sensitivity of the Area to the Health Effects of PM₁₀

7.68 The residential properties are considered to be high sensitivity receptors and the commercial properties medium sensitivity receptors to the health effects of PM₁₀ (see Table A.3 in **ES Volume 3: Appendix Air Quality - Annex 1**).

7.69 A maximum annual mean PM₁₀ concentration of 17.9 µg/m³ has been predicted at the ground level façade of the Proposed Development facing onto Oxford Road (receptor 45) in 2017. The area is thus described to be of low sensitivity to the health effects of PM₁₀ from on-site works and from trackout.

7.70 A summary of the sensitivity of the area to the effects of the construction works is shown in Table 7.12.

Table 7.12 Summary of the Area Sensitivity

Potential Effect	Sensitivity of the Area	
	On-site Works	Trackout
Dust Soiling	Medium	Medium
Health Effects of PM ₁₀	Low	Low

Risk of Impact and Significance

7.71 The dust emission magnitudes (Table 7.11) have been combined with the area sensitivities (Table 7.12) and a risk category has been assigned to each construction activity using the matrix in Table A.5 in **ES Volume 3: Appendix Air Quality - Annex 1**.

7.72 The resultant risk categories (Table 7.13) have then been used to determine the appropriate level of mitigation necessary for a residual effect that is likely to be 'not significant'.

Table 7.13 Summary of the Risk of Impacts Without Mitigation

Construction Activity	Dust Soiling	Health
Demolition	Low	Negligible
Earthworks	N/A	N/A
Construction	Medium	Low
Trackout	Low	Low

Completed Development

Existing Receptors

NO₂

7.73 Predicted annual mean NO₂ concentrations, under the Future Baseline (Development) scenario, and the impact descriptors are shown in Table 7.14.

7.74 Annual mean NO₂ concentrations are below the AQAL at all of the receptors. The change in concentration relative to the AQAL is less than 1% at all receptors, and the impacts are all described as **Negligible** (not significant).

Table 7.14 Predicted NO₂ Impacts in Future Baseline (Development)

	Annual Mean (µg/m ³)		% Change in Concentration Relative to AQAL	Total Concentration as % of AQAL	Impact Descriptor
	WO	W			
1	32.0	32.0	<1	80	Negligible
2	31.7	31.7	<1	79	Negligible
3	32.6	32.7	<1	82	Negligible
4	34.0	34.0	<1	85	Negligible
5	36.8	36.8	<1	92	Negligible
6	32.6	32.6	<1	81	Negligible
7	31.7	31.7	<1	79	Negligible
8	27.9	27.9	<1	70	Negligible
9	32.1	32.1	<1	80	Negligible
10	25.2	25.2	<1	63	Negligible
11	31.4	31.4	<1	79	Negligible
12	31.4	31.5	<1	79	Negligible
13	35.8	35.8	<1	90	Negligible
14	34.0	34.0	<1	85	Negligible
15	30.6	30.6	<1	77	Negligible
16	36.9	36.9	<1	92	Negligible
17	25.6	25.6	<1	64	Negligible
18	26.5	26.5	<1	66	Negligible
19	25.2	25.2	<1	63	Negligible
20	24.5	24.6	<1	61	Negligible
21	32.9	33.0	<1	82	Negligible
22	28.9	28.9	<1	72	Negligible
23	26.8	26.8	<1	67	Negligible
24	29.2	29.2	<1	73	Negligible
25	30.1	30.2	<1	75	Negligible
26	26.0	26.0	<1	65	Negligible
27	28.1	28.1	<1	70	Negligible
28	29.5	29.6	<1	74	Negligible
AQAL	40		-		

Notes: a Exceedances are shown in bold / grey shaded. WO = without scheme, W = with scheme

7.75 Predicted annual mean NO₂ concentrations assuming the Future Baseline (Development) sensitivity analysis scenario and the impact descriptors are shown in Table 7.15.

7.76 Annual mean NO₂ concentrations are below the AQAL at most receptors; however the AQAL is exceeded both without and with the Proposed Development at receptors 3,4, 5, 13, 16 and 21. The change in concentration relative to the AQAL is less than 1% at all receptors, and the impacts are all described as **Negligible** (not significant).

Table 7.16 Predicted NO₂ Impacts in Future Baseline (Development)- Sensitivity Analysis

Receptor	Annual Mean (µg/m ³)		% Change in Concentration Relative to AQAL	Total Concentration as % of AQAL	Impact Descriptor
	WO	W			
1	39.1	39.1	<1	98	Negligible
2	38.8	38.8	<1	97	Negligible
3	40.0	40.1	<1	100	Negligible
4	41.2	41.2	<1	103	Negligible
5	45.0	45.0	<1	112	Negligible
6	39.2	39.2	<1	98	Negligible
7	39.7	39.7	<1	99	Negligible
8	34.4	34.4	<1	86	Negligible
9	39.7	39.7	<1	99	Negligible
10	30.4	30.4	<1	76	Negligible
11	37.5	37.5	<1	94	Negligible
12	37.8	37.8	<1	94	Negligible
13	43.6	43.6	<1	109	Negligible
14	41.1	41.1	<1	103	Negligible
15	36.7	36.8	<1	92	Negligible
16	44.9	45.0	<1	112	Negligible
17	31.0	31.1	<1	78	Negligible
18	32.5	32.5	<1	81	Negligible
19	30.7	30.7	<1	77	Negligible
20	29.8	29.8	<1	75	Negligible
21	41.3	41.3	<1	103	Negligible
22	35.8	35.8	<1	90	Negligible
23	32.8	32.9	<1	82	Negligible
24	36.0	36.0	<1	90	Negligible
25	37.5	37.5	<1	94	Negligible
26	31.7	31.7	<1	79	Negligible
27	33.2	33.2	<1	83	Negligible
28	35.3	35.3	<1	88	Negligible
AQAL	40		-		

Notes: a Exceedances are shown in bold / grey shaded. WO = without scheme, W = with scheme

PM₁₀

7.77 Predicted annual mean PM₁₀ concentrations and the impact descriptors are shown in Table 7.16.

7.78 Annual mean PM₁₀ concentrations are well below the AQAL both without and with the Proposed Development and, as the change in concentration relative to the AQAL is less than 1% at all receptors, the impacts are described as **Negligible** (not significant).

Table 7.17 Predicted PM₁₀ Impacts in Future Baseline (Development)

Receptor	Annual Mean (µg/m ³)		% Change in Concentration Relative to AQAL	Total Concentration as % of AQAL	Impact Descriptor
	WO	W			
1	21.6	21.6	<1	67	Negligible
2	21.3	21.3	<1	67	Negligible
3	21.0	21.0	<1	66	Negligible
4	20.3	20.3	<1	63	Negligible
5	21.2	21.2	<1	66	Negligible
6	19.5	19.5	<1	61	Negligible
7	19.8	19.8	<1	62	Negligible
8	18.4	18.4	<1	57	Negligible
9	20.1	20.2	<1	63	Negligible
10	17.4	17.4	<1	54	Negligible
11	19.1	19.1	<1	60	Negligible
12	19.2	19.2	<1	60	Negligible
13	21.2	21.2	<1	66	Negligible
14	20.3	20.3	<1	63	Negligible
15	18.5	18.5	<1	58	Negligible
16	22.1	22.1	<1	69	Negligible
17	19.1	19.1	<1	60	Negligible
18	19.1	19.1	<1	60	Negligible
19	18.4	18.4	<1	58	Negligible
20	18.2	18.2	<1	57	Negligible
21	21.4	21.5	<1	67	Negligible
22	19.8	19.8	<1	62	Negligible
23	19.1	19.1	<1	60	Negligible
24	20.9	20.9	<1	65	Negligible
25	20.6	20.7	<1	65	Negligible
26	19.4	19.4	<1	61	Negligible
27	17.2	17.2	<1	54	Negligible
28	17.9	17.9	<1	56	Negligible
AQAL	32		-		

Notes: a Exceedances are shown in bold / grey shaded. WO = without scheme, W = with scheme

PM_{2.5}

7.79 Predicted annual mean PM_{2.5} concentrations and the impact descriptors are shown in Table 7.17.

7.80 Annual mean PM_{2.5} concentrations are well below the AQAL both without and with the Proposed Development and as the change in concentration relative to the AQAL is less than 1% at all receptors, the impacts are described as **Negligible** (not significant).

Table 7.18 Predicted PM_{2.5} Impacts in Future Baseline (Development)2

Receptor	Annual Mean (µg/m ³)		% Change in Concentration Relative to AQAL	Total Concentration as % of AQAL	Impact Descriptor
	WO	W			
1	14.3	14.3	<1	57	Negligible
2	14.2	14.2	<1	57	Negligible
3	14.0	14.0	<1	56	Negligible
4	13.3	13.3	<1	53	Negligible
5	13.8	13.8	<1	55	Negligible
6	12.9	12.9	<1	51	Negligible
7	13.3	13.3	<1	53	Negligible
8	12.5	12.5	<1	50	Negligible
9	13.5	13.5	<1	54	Negligible
10	11.9	11.9	<1	48	Negligible
11	12.7	12.7	<1	51	Negligible
12	12.7	12.7	<1	51	Negligible
13	13.8	13.8	<1	55	Negligible
14	13.3	13.3	<1	53	Negligible
15	12.3	12.3	<1	49	Negligible
16	14.3	14.3	<1	57	Negligible
17	12.9	12.9	<1	52	Negligible
18	12.9	12.9	<1	52	Negligible
19	12.6	12.6	<1	50	Negligible
20	12.5	12.5	<1	50	Negligible
21	14.3	14.3	<1	57	Negligible
22	13.4	13.4	<1	54	Negligible
23	13.0	13.0	<1	52	Negligible
24	14.0	14.0	<1	56	Negligible
25	13.8	13.9	<1	55	Negligible
26	13.1	13.1	<1	52	Negligible
27	11.6	11.6	<1	46	Negligible
28	12.0	12.0	<1	48	Negligible
AQAL	25		-		

Notes: a Exceedances are shown in bold / grey shaded. WO = without scheme, W = with scheme

Site Suitability

7.81 Predicted concentrations of NO₂, PM_{2.5} and PM₁₀ at the Proposed Development are shown in Table 7.18.

7.82 Annual mean concentrations are predicted to be below the AQALs at all of the receptors; therefore, air quality at the Proposed Development is considered to be acceptable for the location.

Table 7.19 Site Suitability (Opening Year)

Receptor	Annual Mean (µg/m ³)			
	NO ₂		PM ₁₀	PM _{2.5}
	With Emissions Reductions	No Emissions Reductions		
29	28.0	33.0	17.2	11.6
30	27.9	33.0	17.2	11.6
31	27.5	32.3	17.0	11.4
32	27.2	31.9	16.8	11.3
33	26.9	31.6	16.6	11.3
34	26.7	31.4	16.6	11.2
35	26.6	31.3	16.5	11.2
36	26.7	31.4	16.5	11.2
43	28.1	33.4	17.1	11.5
44	29.8	35.9	17.8	11.9
45	29.7	35.7	17.8	11.9
46	28.1	33.4	17.1	11.5
AQAL	40		32	25

MITIGATION AND MONITORING MEASURES

Demolition and Construction

7.83 The application site has been identified as a low-medium risk site from dust soiling and a negligible-low from PM₁₀ during the construction phase, as set out in Table 7.13. The dust risk category has been used, along with the professional judgement of the consultant, to determine the appropriate level of mitigation at the site. The IAQM guidance is clear that, with appropriate mitigation in place, the residual effect will normally be 'not significant'. With the implementation of the mitigation measures, taken from the IAQM guidance, set out in **ES Volume 1: Chapter 13 - Mitigation and Monitoring**, the residual effects are judged to be insignificant.

Completed Development

7.84 The assessment has demonstrated that the scheme will not cause any exceedances of the air quality objectives in areas where they are not currently exceeded, nor will the scheme introduce receptors into an area where the AQALs will be exceeded.

7.85 The assessment has demonstrated that the overall air quality effect of the Proposed Development will be 'not significant'. As such, there is no requirement for further mitigation.

RESIDUAL EFFECTS

7.86 The residual effects resulting from the Proposed Development are summarised in Table 7.19.

Table 7.20 Summary of Residual Effects

Receptor	Receptor Sensitivity	Residual Effect (Nature and Scale)	Significance	Ge o	D I	P T	R IR	St Mt Lt
Demolition and Construction								
Dust								
Commercial Properties within 20m of Application Site Boundary	Medium	Negligible	Not Significant	L	D	T	R	ST
Between 10-100 Residential Properties 20-50m from Site Boundary	High	Negligible	Not Significant	L	D	T	R	ST
PM₁₀								
Commercial Properties within 20m of Application Site Boundary	Medium	Negligible	Not Significant	L	D	T	R	ST
Between 10-100 Residential Properties 20-50m from Site Boundary	High	Negligible	Not Significant	L	D	T	R	ST
Completed Development								
NO₂								
Existing Residential Receptors	High	Negligible	Not Significant	B	D	P	IR	Lt
New Residential Receptors	High	Negligible	Not Significant	L	D	P	IR	Lt
PM₁₀								
Existing Residential Receptors	High	Negligible	Not Significant	B	D	P	IR	Lt
New Residential Receptors	High	Negligible	Not Significant	L	D	P	IR	Lt
PM_{2.5}								
Existing Residential Receptors	High	Negligible	Not Significant	B	D	P	IR	Lt
New Residential Receptors	High	Negligible	Not Significant	L	D	P	IR	Lt
Notes: Residual Effect - Scale = Negligible / Minor / Moderate / Major - Nature = Beneficial or Adverse Geo (Geographic Extent) = Local (L), Borough (B), Regional (R), National (N) D = Direct / I = Indirect P = Permanent / T = Temporary R = Reversible / IR= Irreversible St = Short Term / Mt = Medium Term / Lt = Long Term N/A = not applicable / not assessed								

LIKELY SIGNIFICANT EFFECTS

7.87 The assessment has shown that there will be no significant effects during demolition and construction or once the development is completed.

CLIMATE CHANGE

7.88 Climate change can have an impact on air quality and air quality can have an impact on climate change. These interactions are complex and not fully understood.

7.89 Higher summer time temperatures and increased solar radiation will increase the formation of ozone and other reactive compounds in the air, affecting the concentrations of both NO₂ and particulate matter. The net effect

may be an increase in background concentrations of NO₂ and particulate matter compared to the future without development Scenarios.

7.90 NO_x is an indirect greenhouse gas affecting atmospheric concentrations of ozone, methane and particulate matter in the atmosphere. Increasing concentrations of ozone and methane leads to global warming. The effect of particulate matter (also known as aerosols) is more complex with different components having either warming or cooling effects on the climate. For example, black carbon, a pollutant from combustion (including road transport) and particulate nitrate (formed from NO_x emissions) contributes to the warming of the Earth, while particulate sulphates cool the Earth's atmosphere. In addition, particulate matter can affect cloud formation, which also affects the climate.

7.91 Climate change is a long-term process and the impact of emissions depends on the atmospheric lifetime of the emitted species. Compared to greenhouse gases, many substances that affect air quality have short atmospheric lifetimes. Particulate matter for example has a substantial impact but are short-lived and reductions in emissions affect the radiation balance rapidly, in contrast to any reductions in, for example, carbon dioxide.

7.92 Limits on direct emissions of both NO_x and particulate matter set at an international level to control air quality, will also be beneficial for climate change. Emissions have reduced substantially over recent decades and are likely to continue to do so.

7.93 Changes in atmospheric composition and their impact on climate change are uncertain and it is not possible to quantify them at the local level. Therefore, these effects have not been considered further in this chapter.

ASSESSMENT OF FUTURE ENVIRONMENT

Evolution of the Baseline Scenario

7.94 The future baseline condition is represented in this assessment as 'Do Nothing' scenario. It is considered that the future baseline will be mainly affected by background pollution levels, variations of the composition of local traffic and changes to the volume of traffic resulting from the completion of other Committed Development schemes located in proximity to the site.

7.95 If the Proposed Development was not to come forward, it is expected that the site would remain in its current state. Air quality within the local environment is generally expected to improve with time, due to for example, more stringent emission standards for motor vehicles.

7.96 As described within the section 'Modelling Uncertainty' a sensitivity analysis has been undertaken for the Future Baseline (Do Nothing), which assumes no reduction in road traffic emission in the future. This scenario is therefore considered a worst case scenario.

Cumulative Effects Assessment

7.97 This section identifies the effects of the Proposed Development in combination with the effects of other Committed Developments within the surrounding area (identified in **ES Volume 1: Chapter 2 - EIA Methodology**).

Demolition and Construction

7.98 The demolition and construction phase of the development may overlap with other Committed Developments in the area. However, it is assumed that each individual cumulative construction site will have to adopt controls to prevent significant transfer of airborne pollutants beyond their site boundaries and the use of monitoring to confirm the effectiveness of these measures.

7.99 It has been recommended in the dust mitigation section that regular liaison meetings are held at other high risk construction sites within 500 m of the site boundary to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.

7.100 Therefore, cumulative effects at existing and future receptor locations will be managed by the contractors to avoid the occurrence of significant cumulative effects.

7.101 Cumulative effects of the demolition and construction phase are therefore considered to be temporary, local and overall mitigation in place, the impacts would be **Negligible**.

Completed Development

7.102 The Future Baseline scenarios accounted for traffic generated by Committed Developments within the surrounding area. Therefore, the modelled pollutant concentrations include additional road traffic emissions

from the Committed Developments, and have already been accounted for within the assessment presented in this ES Chapter.

- 7.103** It is therefore concluded that the cumulative effects arising from the completed development would not be significant.

Minster Quarter Area Development Framework

- 7.104** The Minster Quarter Area Development Framework (MQADF) may lead to cumulative effects on dust and PM₁₀ concentrations during the demolition and construction phase; however, with appropriate dust mitigation in place, the impact would be negligible, and the cumulative effect would not be significant.
- 7.105** The MQADF may lead to an increase in traffic in the local area; however, as the impact of the Proposed Development on air quality at existing receptors has been shown to be negligible, the inclusion of this additional traffic in the baseline scenario would result in the effect remaining insignificant.
- 7.106** With regard to site suitability, the air quality objectives are predicted to be achieved by a wide margin at new residential receptors within the Proposed Development. Given the height of the new residential receptors above the road, the level of additional traffic generated by the MQADF would be unlikely to significantly increase pollutant concentrations at the Proposed Development and the effects of road traffic emissions on the new receptors would remain insignificant.
- 7.107** It is anticipated that with a new residential receptor and the associated car use and parking which is expected to develop with the schemes outlined in the framework, that this may lead to an increase in pollutants being emitted in the local area. However, the adverse effect relating to the emissions is likely to be minimised due to an anticipated improvement in the fuels used and therefore a general decrease in the anticipated emissions going forward.