



Air Quality Feasibility Assessment – Phase 1

River Academy, Reading

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Mace Limited



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Glossary of Terms

Term	Definition
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
DCLG	Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
DS	DustScanAQ
EPUK	Environmental Protection UK
EU	European Union
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LNR	Local Nature Reserve
Mace	Mace Limited
NAQS	National Air Quality Strategy
NO	Nitric oxide
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NRMM	Non-road Mobile Machinery
PPG	Planning Practice Guidance
Ramsar Sites	Designated Wetland
RBC	Reading Borough Council
SAC	Special Areas of Conservation
SPA	Special Protection Areas
SSSI	Sites of Special Scientific Interest
WHO	World Health Organisation

1 Introduction

1.1 Overview

DustScanAQ (DS) have been instructed by Mace Limited (Mace) to produce an Air Quality Feasibility Assessment for the proposed River Academy under the Department for Education's Free School Programme at the former Linerboard Golf Club, Reading, RG1 8EQ. This is hereafter referred to as the 'proposed development'.

The outcomes of this report will inform the scope of any future Air Quality Survey as well as make recommendations regarding the scope of a future Air Quality Assessment required for planning.

1.2 Objective

The purposes of this report are outlined below:

- Review potential impacts from the surrounding neighbourhood environment on the proposed school;
- Review readily available air quality data applicable to the site;
- Preliminary assessment of the existing site; and
- Propose a Phase 2 monitoring scope.

1.3 Proposed Site Location

The proposed development is located within the jurisdiction of Reading Borough Council (RBC) along Richfield Avenue, Reading, RG1 8EQ. The proposed development site is bounded to the north by the River Thames; to the east by Rivermead Leisure Complex and Caversham Bridge Garden Centre; to the south by Richfield Avenue and a large industrial complex with open fields; and agricultural ground to the west of the site.

The extent of the proposed development is shown in Figure 1.1.

There are no Special Areas of Conservation (SACs), Special Protection Areas (SPAs), designated wetlands (Ramsar Sites) or Sites of Special Scientific Interest (SSSIs) within close proximity of the proposed development. The closest designed wildlife site to the proposed development is the Sulham and Tidmarsh Woods and Meadows SSSI, approximately 6.2 km to the west.



Figure 1.1: Proposed development site location

1.4 Key Pollutants

The key pollutant associated with the construction phase of the project will be 'disamenity' or 'nuisance' dust. Nitrogen dioxide (NO₂) and particulate matter (PM_{2.5} and PM₁₀) may also be associated with emissions from non-road mobile machinery (NRMM) and construction related traffic.

The key pollutants associated with the operational phase of the proposed development will be road traffic emissions including NO₂ and particulate matter (PM_{2.5} and PM₁₀). These pollutants are therefore considered as part of this assessment.

Further details of the key pollutants are presented below.

1.4.1 Nitrogen Dioxide (NO₂)

NO₂ and nitric oxide (NO) are collectively referred to as oxides of nitrogen (NO_x). During fuel combustion, atmospheric nitrogen combines with oxygen to form NO, which is not considered harmful. Through a chemical reaction with ozone (O₃), NO further combines with oxygen to create NO₂ which can be harmful to human health and vegetation. The foremost sources of NO₂ in the UK are combustion activities, mainly road transport and power generation.

1.4.2 Particulate Matter

Particulate matter as a term refers to a mixture of solid particles and liquid droplets suspended in the air. These particles come in many sizes and shapes and can be made up

of hundreds of different chemicals. Some particles, such as dust, dirt, soot or smoke, are large or dark enough to be seen with the naked eye. Others can be so small that they can only be detected using an electron microscope. Fine dust, essentially particles up to 10 micron (μm), is commonly referred to as PM_{10} .

PM_{10} is known to arise from a number of sources such as construction sites, road traffic movement, industrial and agricultural activities. Very fine particles ($\text{PM}_{0.1} - \text{PM}_{2.5}$) are known to be associated with pollutants such as NO_x and sulphur dioxide (SO_2) emitted from power plants, industrial installations and road transport sources.

$\text{PM}_{2.5}$ is generally associated with combustion and traffic sources and is more likely to be associated with the operational phase of the proposed development.

1.4.3 Disamenity Dust

'Dust' is generally regarded as particulate matter up to 75 μm in diameter and in an environmental context can be considered in two size categories; coarser dust (particles greater than 10 μm) and fine particulate matter (PM_{10} and $\text{PM}_{2.5}$) as described above.

Coarser dust (particles greater than 10 μm) is generally regarded as 'disamenity dust' and can be associated with annoyance, although there are no official standards for dust annoyance¹. Disamenity dust is more readily described than defined as it relates to the visual impact of short-lived dust clouds and the long-term soiling of surfaces.

Although it is a widespread environmental phenomenon, dust is also generated through many anthropogenic activities including materials handling, construction, demolition and vehicle use. Dust is generally produced by mechanical action on materials and is carried by moving air when there is sufficient energy in the airstream. More energy is required for dust to become airborne than for it to remain suspended.

¹ Note that the expression 'nuisance dust' refers here to 'generally visible particulate matter' rather than specifically and in a legal sense to statutory nuisance, as defined in Section 79 of the Environmental Protection Act 1990.

2 Legislation, Policy and Non-Statutory Guidance

2.1 Introduction

This section summarises all legislation, policy, statutory and non-statutory guidelines relevant to the proposed development. Furthermore, the latest regional and local planning policy guidance specifically applicable to the proposed development has been reviewed.

2.2 International (European Union)

The European Union (EU) sets legally binding limit values for outdoor air pollutants to be met by EU countries by a given date. These limit values are based on the World Health Organisation (WHO) guidelines on outdoor air pollutants. These are legally binding and set out to protect human health and the environment by avoiding, preventing or reducing harmful air pollution effects.

Directive 2008/50/EC² on ambient air quality and cleaner air for Europe entered into force in June 2008. This merged the existing 'Daughter' Directives^{3,4,5,6} (apart from the fourth Daughter Directive), maintaining existing air quality objectives set out by 'Daughter' Directives for:

- Sulphur dioxide (SO₂);
- Nitrogen dioxide (NO₂);
- Oxides of nitrogen (NO_x);
- Particulate matter (PM_{2.5} and PM₁₀);
- Lead (Pb);
- Benzene(C₆H₆);
- Carbon monoxide (CO); and
- Ozone (O₃).

Directive 2008/50/EC also includes related objectives, exposure concentration obligations and exposure reduction targets for PM_{2.5} (fine particles). The 'Daughter' Directives were based upon requirements set out in the first EU Ambient Air Quality Framework Directive 96/92/EEC⁷.

2.3 National (England)

² European Union. (2008), 'Ambient air quality assessment management', Framework Directive 2004/50/EC.

³ European Union. (1999), 'Ambient air quality assessment management', Framework Directive 1999/30/EC.

⁴ European Union. (2000), 'Ambient air quality assessment management', Framework Directive 2000/3/EC.

⁵ European Union. (2002), 'Ambient air quality assessment management', Framework Directive 2002/3/EC.

⁶ European Union. (2004), 'Ambient air quality assessment management', Framework Directive 2004/107/EC.

⁷ European Union. (1996), 'Ambient air quality assessment management', Framework Directive 96/62/EC.

The 2008 EU ambient air quality directive 2008/50/EC was transposed into English law through the introduction of the Air Quality (Standards) Regulations in 2010⁸ which also incorporated the fourth EU Daughter Directive (2004/107/EC) that set target values for certain toxic heavy metals and polycyclic aromatic hydrocarbons, (PAH).

The UK government has a legal responsibility to meet the EU limit values. Part IV of the 1995 Environment Act⁹ sets guidelines for protecting air quality in the UK and forms the basis of local air quality management. The Environment Act requires local authorities in the UK to review air quality in their area periodically and designate AQMAs where the objectives are not being achieved or are not likely to be achieved within the relevant period. Where an AQMA is designated, local authorities are also required to produce an 'Air Quality Action Plan' (AQAP) detailing the pollution reduction measures that need to be adopted to achieve the relevant air quality objectives within an AQMA.

As part of the Environment Act, the UK Government was required to publish a National Air Quality Strategy (NAQS) to establish the system of 'local air quality management' (LAQM) for the designation of AQMAs. This led to the introduction of the first Air Quality Strategy (AQS) in 1997¹⁰ which has since progressed through several revisions until it was replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007¹¹. Each revision introduced strategies and regulations that considered measures for different pollutants by tightening existing objectives and also by introducing new ones to establish a common framework to protect human health and the environment by achieving ambient air quality improvements.

2.3.1 National Planning Policy Framework

The principal national planning policy guidance in respect of the proposed redevelopment is the National Planning Policy Framework (NPPF)¹². The most recent update of the NPPF was published in February 2019 by the Department for Communities and Local Government (DCLG).

The NPPF 2019 contains five sections which are relevant to air quality.

Section 103 states that:

"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural

⁸ Statutory Instrument. (2010), 'The Air Quality Standards Regulations', No. 1001. Queen's Printer of Acts of Parliament.

⁹ Parliament of the United Kingdom. (1990), 'Environmental Protection Act', Chapter 43. Queen's Printer of Acts of Parliament.

¹⁰ Department for Environment Food and Rural Affairs. (1997), 'The United Kingdom National Air Quality Strategy', Cm 3587, Department for Environment Food and Rural Affairs.

¹¹ Department for Environment Food and Rural Affairs. (2007), 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland', Cm 7169, Department for Environment Food and Rural Affairs.

¹² National Planning Policy Framework. Accessible at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

areas, and this should be taken into account in both plan-making and decision-making.”

Section 170 (e) states that:

“preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information...”

Section 180 states that:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.”

Section 181 states that:

“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”

Section 183 states that:

“The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.”

2.3.2 National Planning Practice Guidance

The DCLG published a number of supporting web based resources of Planning Practice Guidance (PPG)¹³ to supplement the NPPF. With respect to air quality the PPG¹⁴ provides guidance on when air quality is relevant to a planning application. It states that:

“Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.”

The PPG also states that, when deciding whether air quality is relevant to a planning application, the applicant should consider whether the proposal will:

- *“Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield.....*
- *Introduce new point sources of air pollution.....,*
- *Expose people to harmful concentrations of air pollutants,*
- *Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.....,*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value.”*

2.3.3 Relevant Air Quality Standards

A summary of the relevant Air Quality Objectives (AQO) and where they are applicable are presented in Table 2.1 and Table 2.2 respectively. The AQO listed in Table 2.1 are only applicable at locations where a member of the public could be reasonably expected to spend the relevant averaging period. Further examples of this are presented in Table 2.1.

Table 2.1: AQO relevant to the proposed development

Pollutant	Averaging Period	AQO ($\mu\text{g}/\text{m}^3$)	Exceedance Allowance	Percentile Equivalent
Nitrogen Dioxide (NO_2)	Annual	40	-	-
	1-hour	200	18 per annum	99.8 th
Particulate Matter (as PM_{10})	Annual	40	-	-
	24-hour	50	35 per annum	90.4 th
Particulate Matter (as $\text{PM}_{2.5}$) ^(a)	Annual	25	-	-

¹³ National Planning Practice Guidance web-based resource. Accessible at: <http://planningguidance.planningportal.gov.uk/>

¹⁴ Paragraph: 005 Ref ID 32-005-20140306, revision date 01.11.2019

Pollutant	Averaging Period	AQO ($\mu\text{g}/\text{m}^3$)	Exceedance Allowance	Percentile Equivalent
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Notes: (a) This is a target value set for a 15% reduction in concentrations at urban background aimed to achieve between 2010 and 2020

Source: Department for Environment Food and Rural Affairs (2016): 'Local Air Quality Management Technical Guidance' (TG.16).

Table 2.2: Examples of where the AQO should apply

Averaging period	Objectives should apply at	Objectives should not apply at
Annual	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.
24 Hour	All locations where the annual mean objective would apply, together with hotels and gardens of residential properties ^(a) .	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.
1 Hour	All locations where the annual mean and 24 and 8-hour mean objectives apply. 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. Any outdoor locations where members of the public might reasonably have expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Note:

(a) "Such locations should represent parts of the garden where relevant public exposure to pollutants is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied."

Source:

Department for Environment Food and Rural Affairs (2016): 'Local Air Quality Management Technical Guidance' (TG.16).

2.3.4 Statutory Nuisance

It is recognised that the planning system presents a way of protecting amenity. However, in cases where planning conditions are not applicable to a development/installation, the requirements of the Environmental Protection Act 1990 still apply. Under Part III of the Environmental Protection Act 1990, local authorities have a statutory duty to investigate any complaints of:

- *“any premises in such a state as to be prejudicial to health or a nuisance*
- *smoke emitted from premises so as to be prejudicial to health or a nuisance*
- *fumes or gases emitted from premises so as to be prejudicial to health or a nuisance*
- *any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance*
- *any accumulation or deposit which is prejudicial to health or a nuisance”*

Where the local authority establishes that any one of these issues constitutes a statutory nuisance and believes it to be unreasonably interfering with the use or enjoyment of someone’s premises and/or is prejudicial to health, an abatement notice will be served on the person responsible for the offence or the owner / occupier. Failure to comply with the notice could lead to a prosecution. It is however considered as a defence if the best practicable means to prevent or to counteract the effects of the nuisance are employed.

2.4 Local (Reading Borough Council)

2.4.1 Reading Borough Local Plan

The Reading Borough Local Plan¹⁵, adopted on 04 November 2019, sets out planning policies for development in the borough of Reading up to the year of 2036. This document is the main consideration in the decision making for planning applications. Policy EN15: Air Quality is a specific policy which relates to air quality within RBC. EN15 states:

“Development should have regard to the need to improve air quality and reduce the effects of poor air quality.

- Development that would detrimentally affect air quality will not be permitted unless the effect is to be mitigated. The following criteria should be taken into account:*
 - *Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would worsen air quality;*

¹⁵ Reading Borough Council, (2019). ‘Reading Borough Local Plan: Adopted November 2019’.

- *Whether the development is within, or accessed via, an Air Quality Management Area; and*
 - *Whether it can be demonstrated that a local worsening in air quality that would not detrimentally affect human health or the environment would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.*
- ii. *Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within, an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application. If there are significant detrimental effects that cannot be mitigated, the application should be refused.*
- iii. *Where required, planning obligations will be used to secure contributions to measures to tackle poor air quality or for air quality monitoring.”*

Policy CC9: Securing Infrastructure, also makes direct reference to air quality. CC9 includes:

“Proposals for development will not be permitted unless infrastructure, services, resources, amenities or other assets lost or impacted upon as a result of the development or made necessary by the development will be provided through direct provision or financial contributions at the appropriate time.

.....

Other measures, as follows, should also be considered where a specific need is identified and justified:

.....

Measures to tackle poor air quality or for on-going air quality monitoring....”

There are numerous further policies specific to areas within Reading which refer to air quality; these largely refer to residential development and none cover the area of the proposed development.

2.4.2 Air Quality Action Plan

RBC are in the process of updating their Air Quality Action Plan (AQAP), as some of the actions outlined in the 2009 AQAP¹⁶ have either been completed or superseded. The updated AQAP¹⁷, released in 2016, splits the main actions to improve air quality into two areas: Intervention and Education/Promotion. Below are some of the actions that relate to the proposed development:

¹⁶ Reading Borough Council (2009). 'Air Quality Action Plan. January 2009'

¹⁷ Reading Borough Council (2016). 'Air Quality Action Update'.

- Interventions:
 - Work towards the electrification of vehicle fleet through the introduction of charging points into car parks and as part of new developments;
 - Traffic signal upgrading to manage congestion on the transport network; and
 - Ensure future developments do not result in any further deterioration of air quality.
- Education/Promotion
 - Continue to monitor air pollution at existing monitoring locations and make results available to view on RBC website;
 - Generate a larger proportion of energy from renewable sources. 8% by 2020; and
 - Provide advice, guidance and support to improve home energy efficiency through the private sector renewal scheme and winter watch.

3 Neighbouring Sites

The primary sources of NO₂ and PM pollution with respect to the proposed development site are road sources. The predominant road source with respect to the proposed development is Richfield Avenue which runs along the southern boundary of the site. Road source pollution from motor vehicles consists of primary exhaust emissions of both NO₂ and PM, as well as PM from brake and tire wear and resuspension of PM from the road surface.

To the west of the site there are agricultural fields associated with a farm approximately 550 m from the proposed development. Agriculture can be a source of fine particulate pollution resulting from the use of nitrate fertilisers, muck spreading and ploughing of soil, especially in dry conditions.

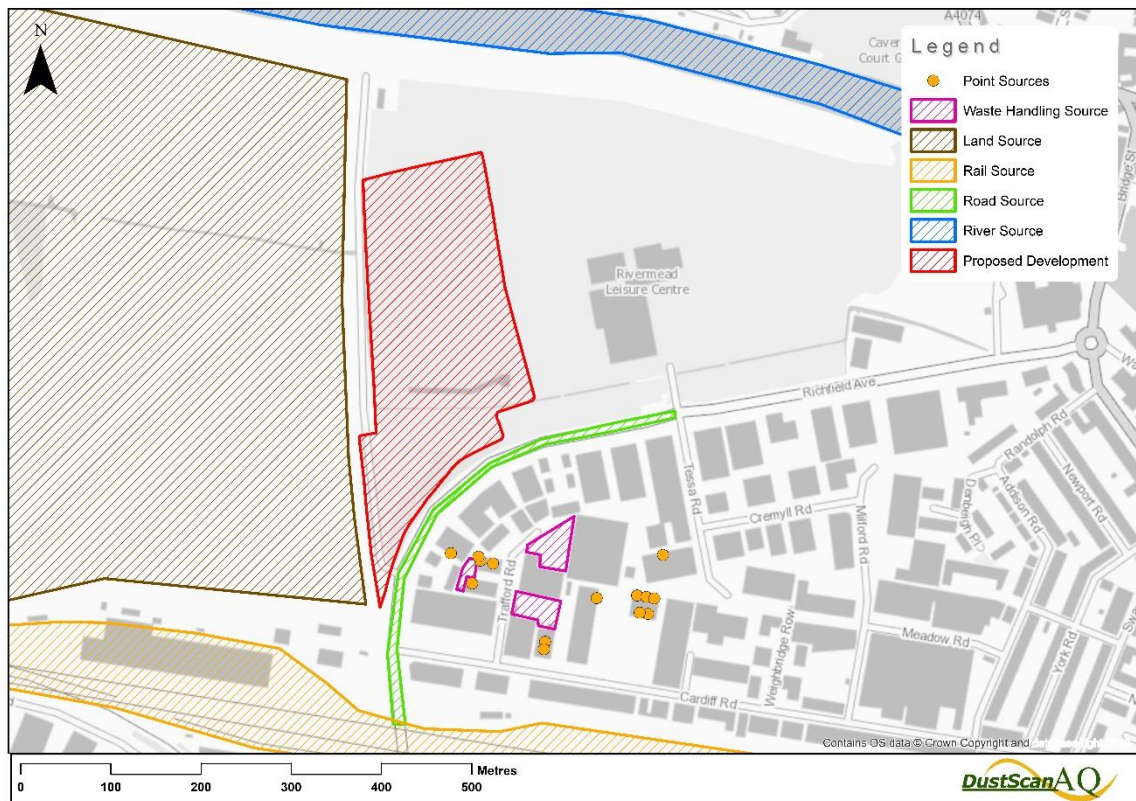
The River Thames lies approximately 120 m to the north of the proposed development. River traffic is exclusively for leisure purposes with private and hire vessels making up the majority. There may be air pollution from motorised vessels, however due to the relatively low volume of traffic and the distance of the development from the River Thames, it is not anticipated that pollution associated with the River Thames will significantly impact air quality at the proposed development.

Across Richfield Avenue to the south and southeast lie various industrial units and office buildings. There are a couple of operators within the site that manage waste which has the potential to give rise to fugitive dust emissions. The proposed development is a minimum of 70 m from the nearest relevant business downwind of the prevailing wind direction and therefore it is not anticipated that there will be an air quality impact at the proposed site.

In addition, several of industrial units have stacks on their roofs; the composition of emissions from these is unknown.

To the south of the proposed development there also lies a train care depot. There have been complaints from residents along Cardiff Road to the southeast of the proposed development, which directly back onto one of the depot facilities, due to emissions and noise from diesel locomotives. The proposed development is a minimum of approximately 170 m from the nearest depot facility and therefore this isn't anticipated to be an air quality issue at the proposed development.

Neighbouring pollution sources are visualised with respect to the proposed development in Figure 3.1. Point sources shown below have been identified using satellite imagery.



4 Baseline Conditions

4.1 Overview

The following section sets out the baseline conditions in relation to air quality for the proposed development. Baseline air quality information is available from a number of sources, including local and national monitoring data reports and websites. For the purposes of this assessment, data has been obtained from the Defra air quality resource website¹⁸ and 2019 RBC Annual Status Report¹⁹.

4.2 Existing Baseline Conditions

RBC declared an Air Quality Management Area (AQMA) on the 19th August 2009 for exceedance of the NO₂ annual mean. The AQMA covers all the main arterial routes in and out of Reading and encompasses the central area of Reading. Figure 4.1 shows that the proposed development lies within the Reading AQMA at the southern boundary.

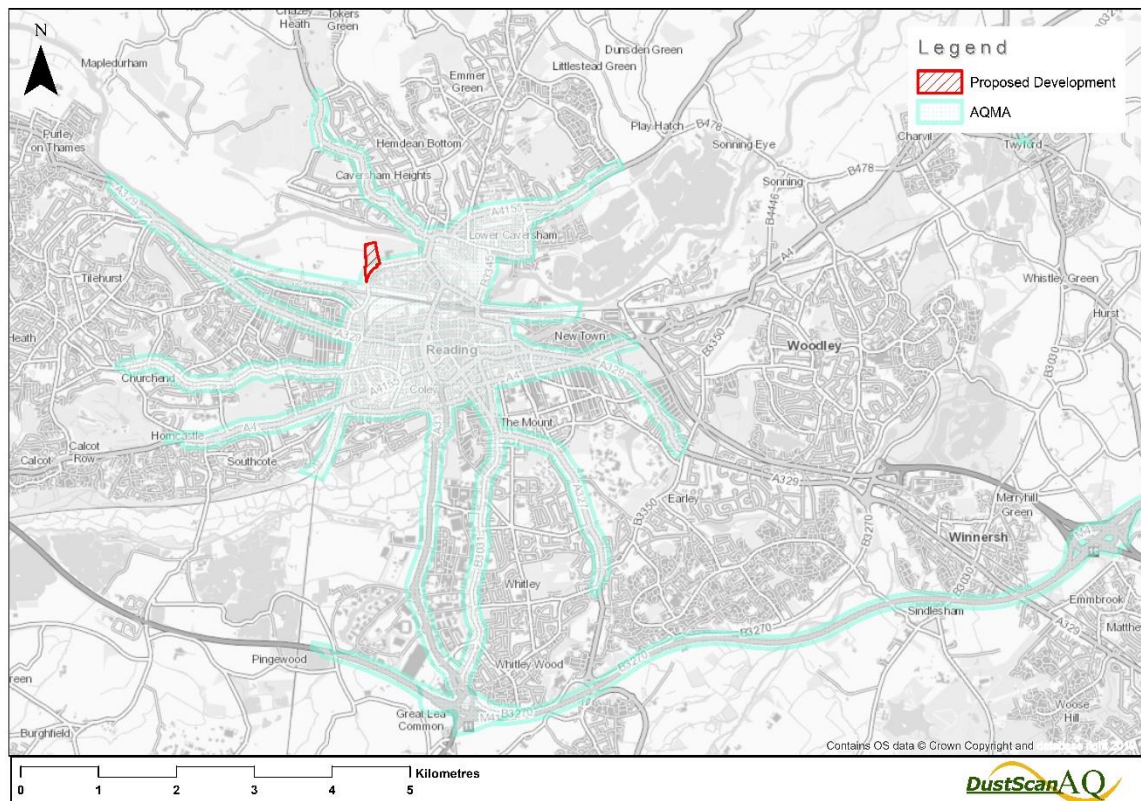


Figure 4.1: Reading AQMA

4.2.1 Automatic Monitoring

RBC undertook automatic monitoring at four sites in 2018, one of which forms part of the Automatic Urban and Rural Network (AURN). The closest automatic monitoring location to the proposed development is RD1, classified as a roadside site on the A4155,

¹⁸ Department for Environmental Food and Rural Affairs. Accessible at: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017>

¹⁹ Reading Borough Council. (2019), '2019 Air Quality Annual Status Report (ASR)'.

approximately 600 m east of the proposed development. The A4155 is a far busier road than Richfield Avenue or Cow Lane; therefore data from this monitor is not considered to be representative of air quality at the proposed development. Results have been provided here, however, for reference and completeness.

The southern boundary of the proposed development fronts onto Richfield Avenue and is therefore representative of a roadside location, though the majority of the site is characteristic of an urban background location.

RBC have one automatic monitor, Reading AURN, which is classed as a background site and located approximately 3.1 km southeast of the proposed development. The locations of RD1 and Reading AURN with respect to the proposed development are shown in Figure 4.2 below.

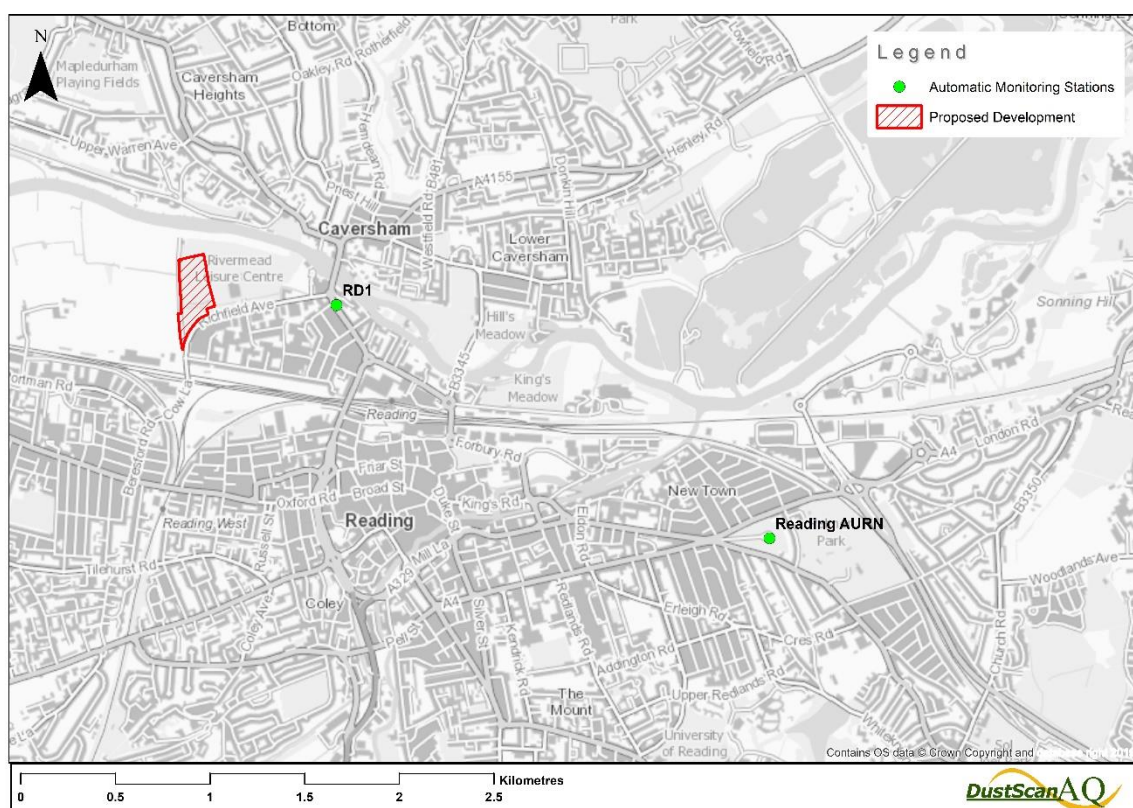


Figure 4.2: RBC Automatic Monitoring Locations

Monitored NO₂ and PM₁₀ concentrations at for RD1 and Reading AURN for the latest three years of available data are presented below in Table 4.1 to Table 4.4. PM_{2.5} was only monitored at the Reading AURN site, with the latest 3 years of data presented in Table 4.5.

Table 4.1: RBC Automatic Monitoring NO₂ Annual Mean Concentrations (µg/m³)

Site ID	Site Classification	NO ₂ Annual Mean (µg/m ³)		
		2016	2017	2018
Reading AURN	Urban Background	34	29	26

RD1	Roadside	39	37	40
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Notes: Exceedances of the NO₂ annual mean objective of 40 µg/m³ are shown in **bold**.

Means have been “annualised” in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%.

Table 4.2: RBC Automatic Monitoring NO₂ 1-Hour Mean Exceedances

Site ID	Site Classification	NO ₂ 1-Hour Means >200 µg/m ³ (µg/m ³)		
		2016	2017	2018
Reading AURN	Urban Background	4 (112)	0	0
RD1	Roadside	0	0	7

Notes: Exceedances of NO₂ 1-hour mean objective are highlighted in **bold** (not to be exceeded more than 18 times/year).

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets. Means have been “annualised” in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%.

Table 4.3: RBC Automatic Monitoring PM₁₀ Annual Mean Concentrations (µg/m³)

Site ID	Site Classification	PM ₁₀ Annual Mean (µg/m ³)		
		2016	2017	2018
Reading AURN	Urban Background	13	12	13
RD1	Roadside	20	23	24

Notes: Exceedances of the PM₁₀ annual mean objective of 50 µg/m³ are shown in **bold**.

Means have been “annualised” in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%.

Table 4.4: RBC Automatic Monitoring PM₁₀ 24-Hour Mean Exceedances

Site ID	Site Classification	NO ₂ 1-Hour Means >200 µg/m ³ (µg/m ³)		
		2016	2017	2018
Reading AURN	Urban Background	3	3	1 (24)
RD1	Roadside	5	7	3

Notes: Exceedance of the PM₁₀ short term AQO of 50 µg/m³ over the permitted 35 days per year or where the 90.4th percentile exceeds 50 µg/m³ are shown in **bold**. Where the period of valid data is less than 90% of a full year, the 90.4th percentile is shown in brackets after the number of exceedances. Means have been “annualised” in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%.

Table 4.5: RBC Automatic Monitoring PM_{2.5} Annual Mean Concentrations (µg/m³)

Site ID	Site Classification	PM _{2.5} Annual Mean (µg/m ³)		
		2016	2017	2018
Reading AURN	Urban Background	9	10	7

Notes: Exceedances of the PM_{2.5} annual mean objective of 25 µg/m³ are shown in **bold**.

Means have been “annualised” in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%.

4.2.2 RBC Non-Automatic (Diffusion Tube) Monitoring

RBC undertook non-automatic NO₂ monitoring using diffusion tubes at 57 sites across its jurisdiction in 2018. Figure 4.3 shows 11 of the closest RBC diffusion tube monitoring locations to the proposed development, along with all diffusion tubes co-located with an AURN site at a 'background' location. The closest diffusion tube location to the proposed development site is the roadside location DT29, located approximately 390 m to the south. DT29 is also considered to be the most representative RBC diffusion tube location due to its position along Cow Lane, which becomes Richfield Avenue just south of the proposed development, with no major junction in between. It can therefore be assumed that the number of traffic movements along Richfield Avenue in front of the proposed development, and the number of traffic movements along Cow Lane are comparable. Background locations DT02-04 are considered to be representative of air quality at the rest of the proposed development site.

Table 4.6 presents the results for the 11 RBC diffusion tubes outlined above. The NO₂ concentrations presented are for the latest three years of data available from RBC.

Table 4.6: RBC Diffusion Tube Monitoring Annual Mean Concentrations (µg/m³)

Site ID	Site Name	Site Classification	Annual mean NO ₂ Concentration (µg/m ³)		
			2016	2017	2018
DT02	AURN Co-location	Urban Background	19	18	18
DT03			18	19	19
DT04			19	18	19
DT29	Cow Lane Bridges	Roadside	32	33	29
DT44	50 Cardiff Rd	Roadside	29	30	28
DT45	125 Cardiff Road	Roadside	28	28	23
DT46	Railway Depot	Roadside	35	34	27
DT48	Caversham Co-location	Roadside	37	38	35
DT49			38	36	37
DT50			36	37	37
DT53	131 Caversham Road	Roadside	36	36	35

Note: Exceedances of annual mean objective of 40 µg/m³ are highlighted in **bold**. Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%.

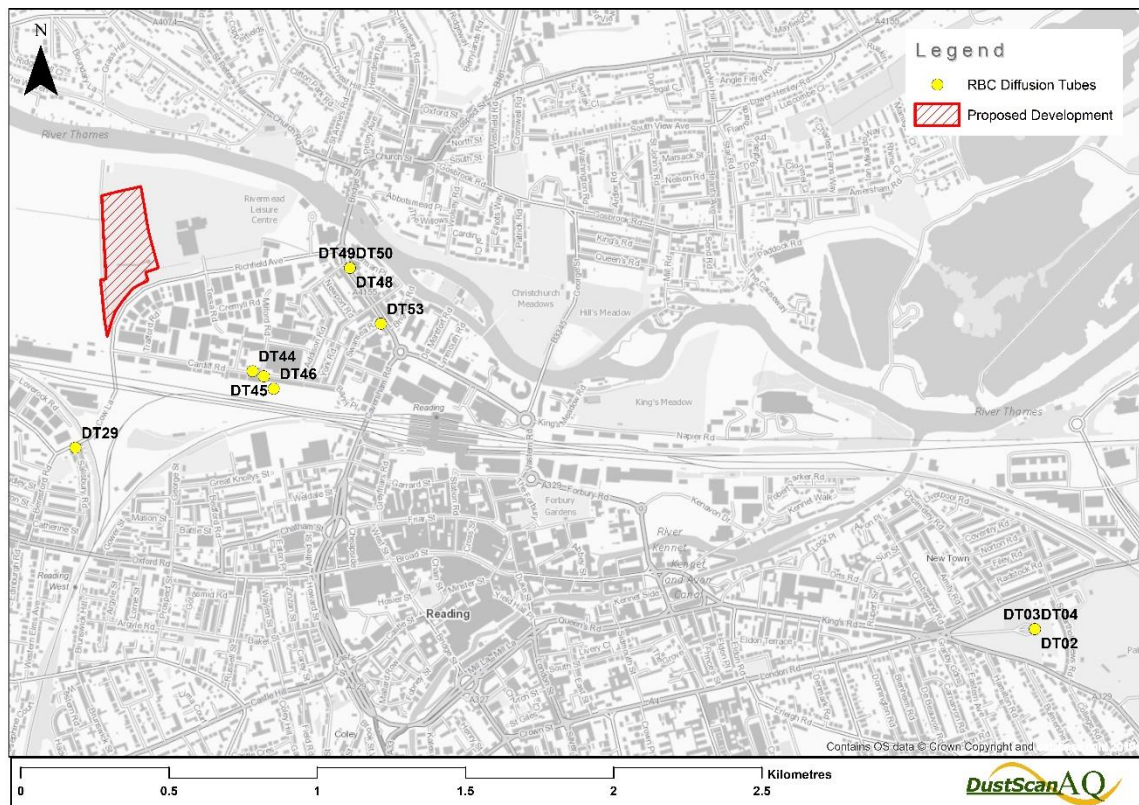


Figure 4.3: RBC Diffusion Tube Locations

4.3 Defra Modelled Background Pollution Concentrations

Defra provides background pollution concentration estimates to assist local authorities in undertaking their 'Review and Assessment' work. This data is available to download from the Defra air quality resource website for NO_x, NO₂, PM₁₀ and PM_{2.5} for every 1 km X 1 km grid square for all local authorities. The current dataset is based on 2017 background data and future year projections are available for 2017 to 2030. The background dataset provides breakdown of pollution concentrations by different sources (both road and non-road sources).

Table 4.7 presents the predicted background concentrations for the latest year of available monitoring data (2018) from RBC and a worst-case earliest possible year of occupation (2020) for the proposed development.

Table 4.7: Defra Projected Background Concentrations (for proposed development) (µg/m³)

Year	Annual mean Concentration (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
2018	20.7	15.1	10.5
2020	19.0	14.6	10.1

Note: Data presented within the table are derived from the following ordinance survey grid square: 470500, 174500.

4.4 Summary of Baseline Conditions

Table 4.5 presents data from 11 RBC diffusion tube locations from the closest sites and all background locations. DT29 is considered to be most representative of air quality where the proposed development front onto Richfield Avenue. DT29 is located along Cow Lane; Cow Lane becomes Richfield Avenue with no major junctions between the position of DT29 and the proposed development. It can therefore be reasonably assumed that the traffic flows along Cow Lane and Richfield Avenue will be very similar. In 2018 DT29 recorded an annual mean NO₂ concentration of 29 µg/m³, comfortably below the NO₂ annual mean objective.

The majority of the proposed development is characteristic of an urban background site. Within the jurisdiction of RBC there is only one monitoring location classified at urban background where there is an AURN automatic monitoring station and three co-located diffusion tubes.

The co-located diffusion tubes DT02-04 have consistently recorded an NO₂ concentration of around 19 µg/m³ for the latest three years of monitoring data. The Reading AURN automatic monitor has consistently recorded a higher NO₂ concentration, with a monitored NO₂ concentration of 26 µg/m³ in 2018. The Defra modelled background concentration for the same year is more consistent with the concentration recorded by DT02-04 at 20.7 µg/m³. All monitored and modelled NO₂ urban background concentrations are comfortably below the NO₂ annual mean objective.

Concentrations of PM₁₀ and PM_{2.5} are monitored within the jurisdiction of RBC by the Reading AURN automatic monitor. In 2018, the latest year of available ratified monitoring data, the Reading AURN recorded concentrations of 13 µg/m³ and 7 µg/m³ respectively. These values are slightly lower than the Defra modelled background PM₁₀ and PM_{2.5} concentrations for the location of the proposed development, though all monitored and modelled concentrations are comfortably below the respective annual mean objectives.

5 Phase 2 Monitoring Scope

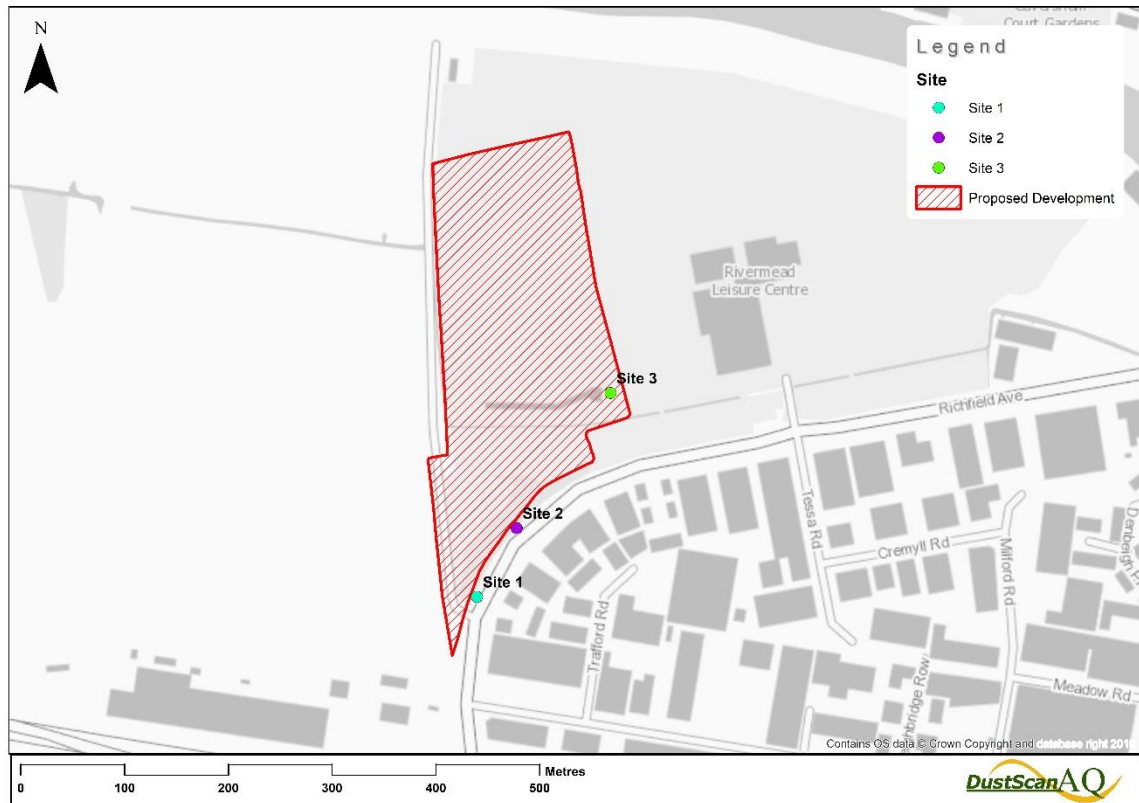


Figure 5.1: Proposed Monitoring Locations

Following an initial site visit on 22/01/2020, DS propose a 3-month survey, using duplicate tubes at the three locations shown in Figure 5.1.

Sites 1 and 2 are considered to be worst-case, situated on the southern boundary of the proposed development site fronting onto Richfield Avenue road.

Site 3 is set back approximately 65 m from Richfield Avenue to monitor the drop-off in NO₂ concentration from the road. It is proposed to be located on the gate leading to the secured land to the north at the east end of the present buildings.

In addition, a travel blank will also be utilised each month.

The diffusion tubes will be 50% TEA in acetone from Gradko International Ltd, the same method and analysis laboratory used by RBC.

Proposed monitoring locations, denoted by a star in Plate 5.1 - Plate 5.3, are subject to relevant permissions to affix tubes.



Plate 5.1: Proposed Site 1



Plate 5.2: Proposed Site 2



Plate 5.3: Proposed Site 3

6 Conclusion

This report provides an initial assessment of the feasibility of the proposed River Academy at former Linerboard Golf Club, Reading, RG1 8EQ. The key objectives of the report were:

- Review potential impacts from the surrounding neighbourhood environment on the proposed school;
- Review readily available air quality data applicable to the site;
- Preliminary assessment of the existing site; and
- Propose Phase 2 monitoring scope.

The above objectives have been addressed in this initial assessment.

Subject to approval, a scope of monitoring will be agreed with RBC. Following the completion of this monitoring a more detailed Phase 2 report will be produced.