



South West Hertfordshire Secondary  
Schools  
Site A

Air Quality Appraisal





## South West Hertfordshire Secondary Schools Site A

Air Quality Appraisal

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# 1 Introduction

## General

- 1.1 JMP Consultants Ltd has been commissioned by Hertfordshire County Council to undertake an Air Quality Appraisal and comparison of air quality at four potential secondary school sites (Sites A, B, C and D), to support the LDF preparation process.
- 1.2 This report focuses on Site A, which is located on land east of A405, and north of the A412. The north-western corner of the site is adjacent to M25 Junction 17. The school location can be viewed in Figure 1.1.

**Figure 1.1 Site location**



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## Scope of the Air Quality Review

- 1.3 Scoping discussions have been undertaken between JMP and Three Rivers District Council (TRDC) (Rosie James's discussions with John Scott, Environmental Health Officer, Pollution). It was agreed that a full technical air quality assessment is not required at this stage.
- 1.4 It has been agreed that JMP should instead undertake a desk-based review of available air quality monitoring data and information to establish the general prevailing air quality situation around the Site A, and also at existing sensitive receptors that may be affected by development-related road traffic. Pollutants considered within the AQA are the key traffic-related pollutants, nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub>).

## Report Structure

- 1.5 Following this brief introductory section, Section 2 contains a review of relevant national and international air quality policy and legislation relative to the site.
- 1.6 Section 3 describes the local air quality in Rickmansworth and the air quality situation around the site.
- 1.7 Section 4 then summaries the main findings and provides recommendations for future assessment.

## 2 Policy Context

### General

- 2.1 This section of the report outlines the air quality context of the proposed development, particularly with regard to national policies and respective legislation. Health impacts relating to air pollution are also discussed.

### National Policy

#### Environment Act 1995

- 2.2 Part IV of the Environment Act 1995 (the Act) requires UK government and devolved administrations to produce a national air quality strategy containing standards, objectives and measures for ameliorating ambient air quality and to continually review these policies.
- 2.3 The Act also provides a legislative framework for a system of Local Air Quality Management (LAQM). This system is an integral part of delivering the UK's air quality obligations.
- 2.4 Under the LAQM regime, responsible authorities are required to carry out a regular review and assessment (R&A) of air quality in their area against defined national objectives, which have been prescribed in regulations for the purposes of LAQM. Where it is found these objectives are unlikely to be met, responsible authorities must designate Air Quality Management Areas (AQMAs) and implement Air Quality Action Plans (AQAPs) to tackle the problems.
- 2.5 Provisions in the Act are largely enabling and give responsible authorities the power to take forward local policies to suit their own needs. Local circumstance will also determine the content of the local air quality policy, designation of AQMAs and the content of AQAPs.

#### The National Air Quality Strategies

- 2.6 Due to the transboundary nature of air pollution, it is appropriate to have an overarching strategy with common aims covering all parts of the UK. For this reason, the National Air Quality Strategy (NAQS) is presented as a joint UK Government and devolved administrations document.
- 2.7 Air quality in the UK has generally continued to improve since the first NAQS, entitled 'The United Kingdom Air Quality Strategy', was adopted in 1997. This was later superseded by 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland' published in 2000.
- 2.8 The 2000 NAQS established a framework for further improvements in ambient air quality in the UK to 2003 and beyond. It identified actions at local, national and international levels to improve air quality. It was followed by an Addendum in February 2003.

2.9 There are a wide range of terms and concepts used in international, national and local air quality policy and legislation and the NAQS discusses air quality in terms of Standards and Objectives. These terms are defined below:

- Standards are the concentrations of pollutants in the atmosphere which can be broadly taken to achieve a certain level of environmental quality. The standards are based on assessment of the effects of each pollutant on human health including the effects on sensitive sub groups and ecosystems.
- Objectives are policy targets often expressed as a maximum ambient concentration not to be exceeded either without exception or with a permitted number of exceedances within a given timescale.

#### **The National Air Quality Strategy 2007**

2.10 The most recent NAQS was published in July 2007 and established a framework for further air quality improvements across the UK. The NAQS sets out the most recent standards and objectives which have been set in order to measure the improvement of air quality.

2.11 The NAQS is a statement of policy intentions or policy targets and as such there is no legal requirement to meet these objectives except in so far as these mirror any equivalent legally binding 'limit values' in EU legislation.

2.12 This latest strategy does not remove any of the objectives set out in the previous strategy or its addendum, apart from replacing the provisional 2010 PM<sub>10</sub> objective in England, Wales and Northern Ireland with the exposure reduction approach for PM<sub>2.5</sub>. In Scotland, the PM<sub>2.5</sub> objective is in addition to the retained 2010 PM<sub>10</sub> objective.

2.13 With minimal exception, the NAQS objectives have been met across the UK for all pollutants except particulate matter (PM<sub>10</sub>) and nitrogen dioxide (NO<sub>2</sub>). These pollutants are directly related to road traffic pollution and many of the areas that breach the NAQS objectives (designated AQMAs) are located close to major road sources.

### **Legislation**

2.14 The NAQS Objectives are transposed into UK legislation by a series of Regulations including, for England, the Air Quality Regulations 2000, the Air Quality (England) Amendment Regulations 2002, and the Air Quality (England) Amendment Regulations 2004.

2.15 In addition, the UK has a legislative requirement to meet air quality 'Limit Values' for key pollutants defined at a European level by European Council Directives:

- Directive 2008/50/EC on ambient air quality and cleaner air for Europe; and
- Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and PAH.

2.16 These Directives are transposed into UK legislation by the Air Quality Standards Regulations 2010.

2.17 Table 2.1 below summarises the NAQS objectives and European 'limit value' obligations for PM<sub>10</sub> and NO<sub>2</sub>, the key transport-related pollutants of concern.

**Table 2.1 Summary of NAQS and EU obligations**

| Pollutant                           | Objective   | Measured as  | Achieved by | European obligations  | Achieved by |
|-------------------------------------|---|--------------|-------------|---|-------------|
| Nitrogen Dioxide (NO <sub>2</sub> ) | 40µgm <sup>-3</sup>   | Annual mean  | 31-Dec-05   | 40µgm <sup>-3</sup>   | 01-Jan-10   |
|                                     | 200µgm <sup>-3</sup> not to be exceeded more than 18 times a year | 1 hour mean  | 31-Dec-05   | 200µgm <sup>-3</sup> not to be exceeded more than 18 times a year | 01-Jan-10   |
| Particles (PM <sub>10</sub> )       | 50µgm <sup>-3</sup> not to be exceeded more than 35 times a year  | 24 hour mean | 31-Dec-04   | 50µgm <sup>-3</sup> not to be exceeded more than 35 times a year  | 01-Jan-05   |
|                                     | 40µgm <sup>-3</sup>   | Annual mean  | 31-Dec-04   | 40µgm <sup>-3</sup>   | 01-Jan-05   |

### The Health Impacts of NO<sub>2</sub> and PM<sub>10</sub>

- 2.18 NO<sub>2</sub> and PM<sub>10</sub> can lead to significant impacts on health, and children are a particularly vulnerable group. 'Effects of Air Pollution on Children's Health and Development' (the WHO, 2005) reported that, '*children with underlying chronic lung diseases, particularly asthma and cystic fibrosis, are especially vulnerable*', and that, '*the evidence also shows a relationship between exposure to ambient air pollutants and adverse effects on the development of lung function*'.
- 2.19 Inhalation of high levels of NO<sub>2</sub> can cause inflammation of the airways and affect lung conditions, including asthma. It can also lower resistance to respiratory infections such as influenza. Continued or frequent exposure to high NO<sub>2</sub> concentrations may also cause increased incidence of acute respiratory illness in children (LAQM.TG(09)).
- 2.20 PM<sub>10</sub> is inhaled deep into the respiratory tract where it can cause inflammation and a worsening of the condition of people with heart and lung diseases. In addition, they may carry surface-absorbed carcinogenic compounds into the lungs (LAQM.TG(09)).
- 2.21 As a consequence of the health implications of children's exposure to poor air quality, it is necessary to determine the prevailing air quality at the site.

## 3 Air Quality Review

- 3.1 The Herts and Beds Air Quality Network, managed by the Environmental Research Group at King's College, London undertakes annual reviews of air quality on behalf of TRDC in compliance with LAQM obligations, and operates a network of both continuous monitoring stations and passive monitoring sites (diffusion tubes).
- 3.2 To establish the air quality situation in the District, and specifically within the locality of the site, a review of available Air Quality Review and Assessment reports, available pollutant monitoring data information and email discussion with the Environmental Health Officer has been undertaken.

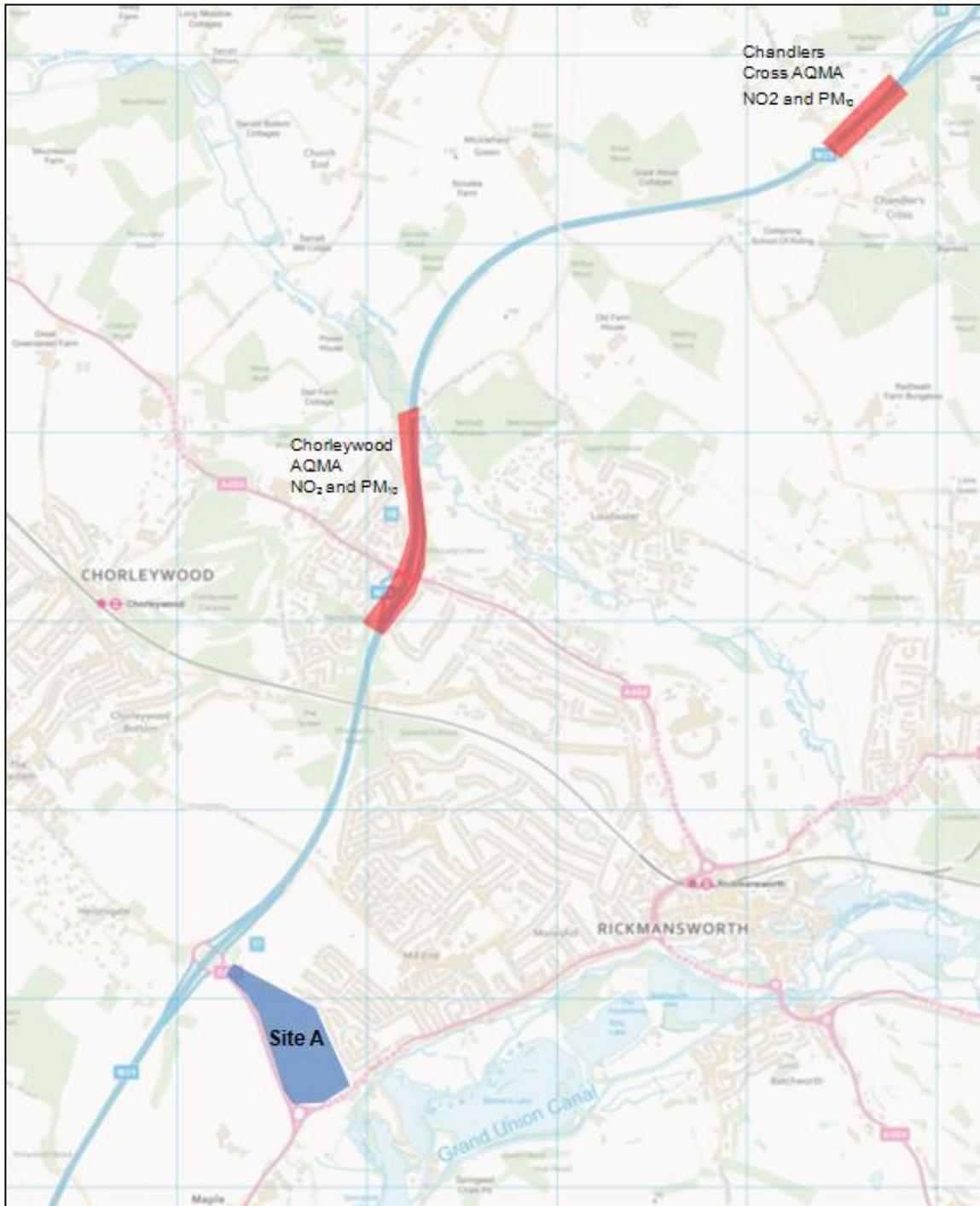
### NO<sub>2</sub> and PM<sub>10</sub> Sources

NO<sub>2</sub> and PM<sub>10</sub> is generated by road traffic using the busy road network that binds the site. The main road sources are the M25 motorway to the north, A405 to the west and A412 to the south.

### Local Air Quality Management

- 3.3 LAQM requires local authorities to undertake a regular R&A of air quality. Current guidance dictates that there are three types of assessment a local authority can carry out.
- 3.4 The first is an Updating and Screening Assessment (U&SA), which is undertaken every three years. The U&SA considers the changes that have occurred in pollutant emissions and sources since the last round of R&A that may affect air quality. The U&SA is then followed by either a Detailed Assessment (DA) or a Progress Report (PR).
- 3.5 A DA is required when the U&SA identifies a risk of exceeding an air quality objective at a location of relevant public exposure and the objective is to determine whether it is necessary to declare an AQMA. If the U&SA does not identify any risk, then a PR is prepared annually in the intervening years between U&SAs.
- 3.6 The latest available R&A report is the U&SA, published in 2006. Requests for later R&A reports from Herts and Beds Air Quality Network have been unsuccessful, and therefore they have not been reviewed as part of this AQA.
- 3.7 In the first round of R&A, which took place between 2003 and 2006, three separate AQMAs were declared in the District for the exceedence of NO<sub>2</sub> and PM<sub>10</sub> NAQS objectives. The two closest AQMAs to Site A are located along and adjacent to the M25 at Chorleywood and Chandlers Cross. They are shown, together with their relative location to the site, in Figure 3.1 below.
- 3.8 It can be seen from Figure 3.1 that there are no designated AQMAs at or adjacent to the site and that the closest AQMA (Chorleywood) is located approximately 2 km from Site A.
- 3.9 The latest available R&A report, the second round U&SA report published in 2006, recommended the reinstatement of diffusion tubes in the AQMAs, and the diffusion tube network was reinstated during December 2006.

Figure 3.1 AQMA locations

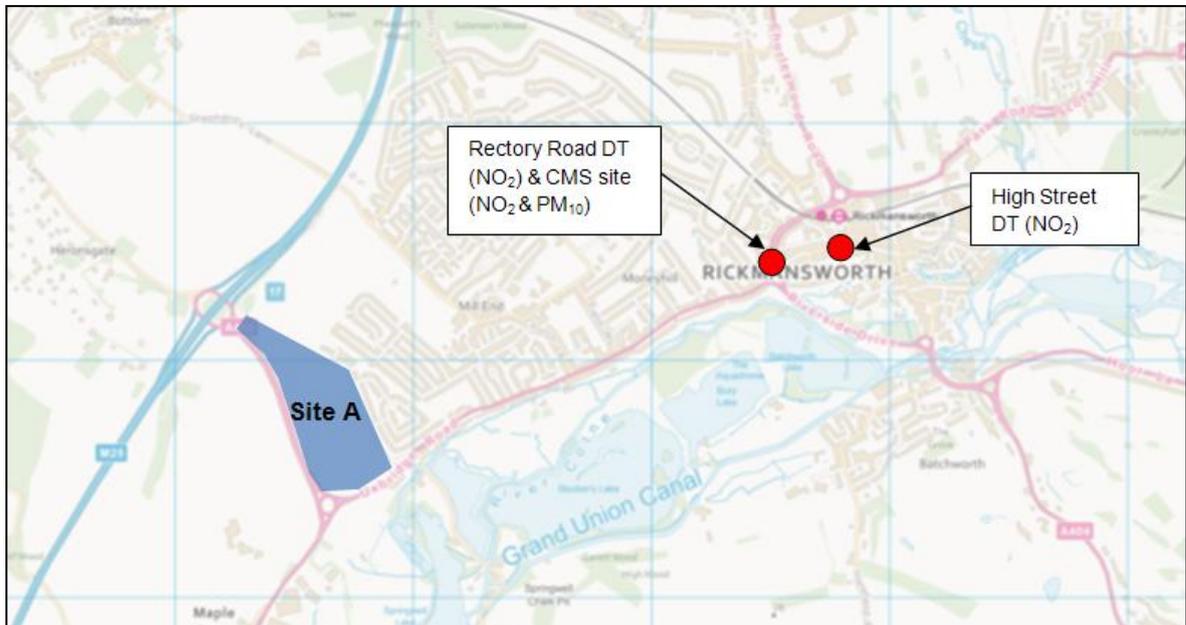


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## Pollutant Monitoring

- 3.10 Figure 3.2 below shows the locations of the nearest pollutant monitoring stations to the site. These comprise two diffusion tube sites ( $\text{NO}_2$ ) and one continuous monitoring site ( $\text{NO}_2$  and  $\text{PM}_{10}$ ) in Rickmansworth town centre.

**Figure 3.2 Monitoring locations**



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- 3.11 Monitoring data available from the Herts and Beds Air Quality Network website indicates that, in 2010  $\text{PM}_{10}$  concentrations recorded at the Rectory Road continuous monitoring site were within the NAQS objectives. Bias corrected diffusion tube monitoring data is not available from the website.
- 3.12 As indicated in Figure 3.2, there are no monitoring sites in the immediate vicinity of the site. Therefore, in absence of monitoring data at the site, appraisal of air quality at the site has been based on qualitative analysis.

## 4 Appraisal

- 4.1 As noted in Section 3 above, there is currently a lack of quantitative data on which to base an appraisal of prevailing air quality at the site. This section considers the evidence above to make a qualitative judgement about air quality at the site.
- 4.2 In the absence of NO<sub>2</sub> and PM<sub>10</sub> monitoring data, the proximity of the busy road network to the site indicates that NO<sub>2</sub> and PM<sub>10</sub> levels may be elevated at the site, particularly at the northern western boundary closest to the M25 motorway, where traffic flows will be highest.
- 4.3 With regard to the absence of a declared AQMA at the site, AQMAs are designated at locations of relevant exposure, and where pollutant monitoring or modelling has been carried to determine pollutant concentrations. As there are currently no relevant receptors at the site (it is currently greenfield) there has been no requirement to undertake NO<sub>2</sub> or PM<sub>10</sub> monitoring here. Therefore, the absence of a designated AQMA does not necessarily indicate that NO<sub>2</sub> and PM<sub>10</sub> concentrations at the site are meeting the NAQS objectives.
- 4.4 With regard to existing sensitive receptors near to the site, they are situated to the east on the A412 Uxbridge Road. As available R&A reports, monitoring data and discussion with the EHO has indicated no air quality issues in this area, it is considered unlikely that school-related traffic will lead to an exceedence of NAQ objectives for NO<sub>2</sub> and PM<sub>10</sub>.
- 4.5 Where objective exceedences may occur within the site, mitigation measures will need to be considered. Traditionally when considering mitigation of air quality impacts, the following mitigation hierarchy is followed:
1. Separation by distance – placement of vulnerable areas away from pollutant sources to reduce exposure.
  2. Internal building layout modification – placement of vulnerable rooms within a building such that they will have windows on facades exposed to the lowest pollutant levels.
  3. Suitable ventilation system and an airtight external envelope – mechanical pumping of air from a clean area on the site into rooms which are located on facades exposed to pollutants exceeding objective levels.

## 5 Recommendations

- 5.1 The preliminary findings described in this report indicate that, with appropriate mitigation measures in place, air quality issues will not preclude the development of a new secondary school on any of the sites.
- 5.2 It is recommended that should the site be taken forward then a full Air Quality Assessment should be undertaken to determine NO<sub>2</sub> and PM<sub>10</sub> concentrations at the site. An Air Quality Assessment will examine the suitability of air quality at the site for future receptors and identify any constraints or issues to be addressed during the master planning process.
- 5.3 If air quality mitigation measures are required to address objective exceedences, the following mitigation hierarchy should be used:
1. Separation by distance
  2. Internal building layout modification
  3. Suitable ventilation system and an airtight external envelope