

Air quality information, with a focus on Adams Road

This fact sheet has been prepared to outline the existing baseline air quality on Adams Road and to carry an initial assessment of the potential air quality effects due to the proposed alignment of the Cambourne to Cambridge Public Transport scheme along Adams Road.

There are currently three existing air quality monitoring sites within 1km of Adams Road but due to their proximity to roads with more traffic than Adams Road each of these are likely to monitor higher pollutant concentrations. A scheme specific air quality monitoring study has recently commenced, which includes an air quality monitor on Adams Road. The results of the monitoring study will be incorporated into the scheme's Environmental Impact Assessment (EIA).

Background to air quality from traffic

Nitrogen dioxide (NO₂) is the main pollutant of concern from road traffic with regards meeting national air quality objectives¹. The highest pollutant concentrations associated with road traffic are found in congested urban areas. NO₂ concentrations on busy roads are generally higher than less busy residential streets.

The national air quality objective for annual mean levels of both NO₂ and particulate matter with a diameter less than 10 microns (PM₁₀) is 40µg/m³ at sensitive locations such as people's homes, schools and hospitals. For particulate matter with a diameter less than 2.5 microns (PM_{2.5}) there is a target of 25µg/m³.

Emissions of particulate matter (both PM₁₀ and PM_{2.5}) from road vehicles are much lower than emissions of oxides of nitrogen (NO_x) and as such have less of an impact on ambient pollutant concentrations.

It is recognised that where concentrations of NO₂ are low and road traffic is the primary source of emissions, the concentration of particulate matter (PM₁₀ and PM_{2.5}) would also be low and within the air quality objectives for PM₁₀ and PM_{2.5}, as such, local authorities do not tend to monitor PM₁₀ and PM_{2.5} in as many locations as NO₂ as it is considerably more expensive (approximately 100 times for each site based on the cost of equipment only).

Air quality monitoring around Adams Road

Information on current air quality monitoring undertaken by Cambridge City Council (CCC) is available on their website². There are no air quality monitoring stations operated by CCC on Adams Road. The closest monitoring station to Adams Road is a 'diffusion tube' monitor which measures NO₂ concentrations and is located on Madingley Road (A1303) between Wilberforce Road and Storey's Way. This site is located approximately 600 metres north of Adams Road.

The monitoring location on Madingley Road has been measuring NO₂ concentrations since 2001 at a distance of less than one metre to the Road. The results (see Table 1) show that at this location annual

¹ DEFRA. UK and EU Air Quality Limits. National air quality objectives and European Directive limit and target values for the protection of human health. Available online at: https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf To meet the objective air quality parameters need to be lower than the threshold for each parameter.

² www.cambridge.gov.uk

mean NO₂ concentrations are below the national air quality objectives and it also shows that air quality has been improving in recent years.

Based on professional judgement, air quality at sensitive receptors is likely to be better than at the monitoring location on Madingley Road. This is because:

- Madingley Road is an arterial road leading into Cambridge from the A428 and experiences much higher levels of traffic compared to Adams Road.
- Government guidance provided by Defra³ demonstrates that pollutant concentrations drop off with distance from the road. It is therefore likely that the annual average NO₂ concentrations at sensitive receptors in Adams Road would be lower than those indicated by Table 1, because, monitoring on Madingley Road is taken with one metre of the road whereas people's houses along Adams road are set further back.

Table 1: NO₂ monitoring data at Madingley Road

Year	Annual mean NO ₂ level (µg/m ³)	Annual mean air quality objective (µg/m ³)
2009	41	
2010	53	
2011	43	
2012	41	
2013	36	
2014	40	40
2015	38	
2016	37	
2017	33	
2018	30	

Source: Cambridge Review and Assessment diffusion tube results available at <https://www.cambridge.gov.uk/media/3446/air-pollution-data-diffusion-tubes-2001-onwards.pdf>

CCC declared an Air Quality Management Area in 2004 for exceedances of the annual mean NO₂ objective. The AQMA is described as an area that encompasses the inner ring road and all the land within it. This intersects the eastern most extent of Adams Road. However, based on the above, although the AQMA extends to Adams Road concentrations with this section of the AQMA are also expected to be below the air quality objectives.

Background air quality around Adams Road

Defra provide regional modelled NO₂, PM₁₀ and PM_{2.5} concentrations for every square kilometre across the UK which is based on data from the National Atmospheric Emissions Inventory. The highest modelled 2019 background concentration for Adams Road is presented in Table 2 which shows modelled annual mean background levels are well below the relevant air quality objective for each pollutant. This supports the assessment that air quality on Adams Road is below the relevant objectives.

³ Defra, Local Air Quality Management Technical Guidance (TG16)

Table 2: DEFRA projected background level on Adams Road

Location	Projected annual mean background level ($\mu\text{g}/\text{m}^3$)			
	NO _x	NO ₂	PM ₁₀	PM _{2.5}
Adams Road background pollutant concentrations	14.6	10.8	14.9	9.5
Road contribution to background concentrations	1.08	0.58 ^(a)	0.07	0.04
Air quality objective / target value	-	40	40	25

Source: DEFRA Air Information Resource available at <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017>

Note: ^(a) 3.4 calculated using DEFRA NO_x to NO₂ Calculator available at https://laqm.defra.gov.uk/documents/NOx_to_NO2_Calculator_v7.1.xlsm

Effects on Adams Road and the need for air quality assessment of C2C

It is estimated approximately 220 bus movements per day will be associated with the scheme and these may use Adams Road. Although the additional buses may use Adams Road and air quality concentrations could increase, these changes are not likely to be significant and are not expected to create exceedances of the air quality objectives.

In addition, there are no immediate reasons to believe the scheme would result in exceedances of the air quality objectives within the AQMA. It is considered more likely that they would contribute to congestion relief within the city and therefore improve air quality in areas of the city which currently experience high concentrations of NO₂, PM₁₀ and PM_{2.5}.

Nevertheless, as the increase in buses would exceed the threshold for the need to undertake an air quality assessment as set out in Environmental Protection UK and Institute of Air Quality Management guidance on 'Land Use Planning & Development Control: Planning for Air Quality'⁴ and Highways England's Design Manual for Roads and Bridges⁵ a detailed air quality assessment will be undertaken as part of the EIA for the scheme.

Further air quality assessments

Mott MacDonald Limited have been commissioned to undertake an air quality monitoring assessment of NO₂ to inform the EIA for the Scheme. This assessment started in July 2019 and will last six months. There is currently one monitoring location located on Herschel Road, and one on Adams Road. The location on Adams Road has been added recently following the decision to revisit the route alignment.

Although it is too soon to draw firm conclusions from the data collected at the Herschel Road monitoring location, initial results do indicate concentrations are well below those monitored on Madingley Road supporting the statements above.

The assessment of the preferred scheme during the EIA will be in accordance with applicable best practice guidance from a range of bodies including Defra, DfT and the Institute of Air Quality Management.

The assessment will adopt a conservative approach and, unless confirmed otherwise, assume that all buses using the scheme would be conventionally powered and meet the minimum emission standard of Euro VI. The assessment will determine what the significance on air quality is across the wider area, and if required, practical mitigation measures will be recommended and implemented in the scheme design.

The results of the air quality EIA will be reported in the final Environmental Statement.

⁴ Environmental Protection UK and Institute of Air Quality Management (2017), 'Land-use Planning & Development Control: Planning for Air Quality. v1.2.

⁵ DMRB