Fareham and Gosport Environmental Health Partnership

Updating And Screening Assessment 2015

Bureau Veritas Air Quality

December 2015

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Document Control Sheet

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Project number	6291767	6291767	6291767

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2015 Updating and Screening Assessment for Fareham and Gosport Environmental Health Partnership

In fulfillment of Part IV of the
Environment Act 1995
Local Air Quality Management

December, 2015

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Report Reference number	**Fareham and Gosport 2015 Updating and Screening Assessment**
Date	**December 2015**

Executive Summary

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work. This Updating and Screening Assessment (USA) is a requirement of the Sixth Round of Review and Assessment for all local authorities. The Report has been undertaken in accordance with the Technical Guidance LAQM.TG(09) and associated tools.

This report considers monitoring data from 2014, assessing this against the Air Quality Strategy (AQS) objectives. It also considers any potential new pollutant emission sources that may have an impact on local air quality.

Two Air Quality Management Areas (AQMAs) are currently in force at Gosport Road and Portland Street, both of these have been designated due to exceedences of the AQS Nitrogen Dioxide (NO_2). Following the conclusions of this report it is recommended that the present AQMA declarations should remain in force.

There was an exceedence of the AQS annual mean NO_2 objective at the Portland Street automatic monitoring station that is located within the Portland Street AQMA.

Following the distance correction of relevant diffusion tube results, the 2014 monitoring results showed there were exceedences of the AQS annual mean NO_2 objective at six monitoring locations within Fareham and Gosport. Of these locations three monitoring sites were located within the designated AQMAs and three monitoring sites were located outside of the AQMAs. The monitoring sites outside of the designated AQMAs with relevant exposure were sites G10 and G12.

Site G10 has exceeded the AQS annual mean NO_2 objective in previous LAQM reports, due to this a Detailed Assessment has previously been completed to assess NO_2 concentrations at residential receptors close to G10. Due to the sites G10 and G12 exceeding in 2014 it is recommended to proceed to a Detailed Assessment to assess the current exposure at residential receptors close to both sites. Upon completion of the Detailed Assessment the Gosport Road AQMA should be

assessed to whether the extent of the boundary should be extended to the north to include the area covered by sites G10 and G12.

Results from automatic Particulate Matter (PM_{10}) monitoring showed that both the annual mean and the 24-hour AQS objectives continued to be met at the Tichborne Way monitoring site.

Two developments have been identified as having the potential to impact local air quality; Stubbington Bypass and the redevelopment of the Daedalus airfield. Both applications have completed Environmental Impact Assessments as part of their planning applications to assess the impacts on local air quality both during the construction and the operation of the schemes. The Stubbington Bypass scheme concluded that there would be a slight beneficial impact from the operation of the scheme, the Daedalus scheme concluded there would be an impact of neutral significance from the operation of the scheme. Both schemes concluded that construction activities would be of minor significance due to mitigation and best practice measures to be implemented. There is no requirement to proceed to a Detailed Assessment for either of the development proposals.

The proposed actions from the Fareham and Gosport 2015 Updating and Screening Assessment are as follows:

- Continue to undertake both automatic and passive monitoring of NO_2 and PM_{10} to identify future trends in concentration and any exceedences of the AQS objectives;
- Continue to monitor at Bury Street as a continuation of the Bury Street Further Assessment;
- The Gosport Road and Portland Street AQMAs will be retained and monitoring will continue within the AQMAs to assess the need for retention of the AQMAs in the future;
- Proceed to a Detailed Assessment for the diffusion tube sites G10 and G12 to assess the NO_2 concentration at relevant residential facades;
- Upon completion of the Detailed Assessment review the boundaries of the Gosport Road AQMA; and
- Proceed to an Annual Progress Report in 2016.

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1 Introduction

1.1 Description of Local Authority Areas

The Boroughs of Fareham and Gosport lie between Southampton and Portsmouth within south-east Hampshire. Both Boroughs form part of the coastal plain that stretches south eastwards from Southampton to Gosport where the land forms a peninsula across from Portsmouth.

The Borough of Gosport is the most densely populated area in Hampshire, it is essentially urban in nature with some areas of open space, notably the Alver Vallery to the west. The Borough of Fareham is a less urban environment than Gosport with 60% of the land being countryside and containing a number of towns including Fareham, Locks Heath, Sarisbury, Park Gate, Warsash and Tictchfield Common. Urban development has continued within the Borough increasing the size of many villages to large residential suburbs.

The area's naval and military history is extensive, with numerous bases located across Fareham and Gosport. The Ministry of Defence once owned 30% of land within the Borough of Gosport, but now have rationalised their operations and much of their land has been released for development.

The principle source of air pollution is from road traffic across Fareham and Gosport, with the M27 running east to west through the Borough of Fareham and localised road emissions from idling vehicles in congestion and constant changes between acceleration and deceleration. Roads that have been identified and subsequently are being monitored for NO_2 emissions include the A27, the A32 and Portchester Road. Other notable pollution sources including commercial, industrial, domestic and shipping sources also make a contribution to background pollution concentrations.

Through the LAQM process Fareham Borough Council has declared two AQMAs; Gosport Road AQMA and Portland Street AQMA. Both declarations were as a result of identified monitored exceedences of the AQS annual mean NO_2 objective, with traffic congestion being the main identified source of monitored emissions.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an AQMA and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to a risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1: Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

1.4.1 Gosport Borough Council

First Round of Review and Assessment:

The first round of Review and Assessment began after an initial assessment of transport and industrial sources and a review of diffusion tube monitoring results. The Stage 1 Air Quality Review and Assessment concluded that the National Objectives

were generally likely to be met but a Second Stage assessment was required for NO_2 and PM_{10} from traffic emissions.

The Second Stage Review results were virtually identical to the First Stage meaning that a Third Stage would have to be completed. The Council was awarded a Supplementary Credit Approval to purchase a permanent automatic monitoring station which was installed at the junction of Fareham Road and Brewers Lane to monitor NO_2 and PM_{10} concentrations.

The Third Stage Assessment required sophisticated statistical modelling techniques and a consultant was appointed to undertake a County-wide review on behalf of the majority of Hampshire local authorities. Exceedences of NO_2 annual mean for 1999 occurred along the County's major roads but, due to improved emission controls and lower background concentrations, no exceedences were predicted in 2005. No existing or predicted future exceedences were identified within Gosport. Future trends were deemed likely to show a decrease in ambient PM_{10} levels and no issues were identified locally. A small exceedence of the 15-minute mean SO_2 objective was predicted near Fawley (in the area of New Forest District Council), mostly within the boundaries of the refinery, but possibly extending beyond it.

Second Round of Review and Assessment:

The Second Round of Review and Assessment began with a USA in 2003. Gosport Borough Council completed this stage in December 2003. The report concluded a Detailed Assessment was not required although there were some reservations regarding the SO_2 released from activities within Portsmouth Harbour.

The 2004 Progress Report concluded that air quality in Gosport met national standards and that concentrations of NO_2 and PM_{10} were predicted to meet the 2005 objectives. Data from some diffusion tube sites was approaching the annual mean objective for NO_2 and trends would be checked to determine if additional monitoring was required. The initial results of SO_2 monitoring around Portsmouth Harbour indicated that any exceedence was unlikely.

The 2005 Progress Report, similar to the 2004 Report concluded that the air quality met national standards and NO_2 and PM_{10} were predicted to meet the 2005 objectives. Although data from the majority of diffusion tube sites showed a reduction

compared to the previous year, one location was predicted to exceed the annual mean objective for NO_2 and would be closely monitored. SO_2 exceedences due to Portsmouth Harbour activities were still considered unlikely but Portsmouth City Council were continuing to monitor the situation.

Third Round of Review and Assessment:

The Third Round of Review and Assessment began with a USA, completed in 2006. The Council did not identify any requirement for detailed review as diffusion tube results now met the NO_2 objective. Portsmouth City Council continued to monitor SO_2 in the port area.

The Progress Report completed in 2007 reported that air quality continued to meet the national standards. Data from NO_2 diffusion tube sites showed a reduction compared to the previous year's results, although the data was not entirely clear. SO_2 tube data indicated that local concentrations were markedly lower than during 2005.

The 2008 Progress Report concluded that air quality continued to meet national standards. Data from the NO_2 and SO_2 diffusion tube sites showed a further downward trend compared to previous years.

Fourth Round of Review and Assessment:

The fourth round of Review and Assessment began with the 2009 USA completed in April 2009. No exceedences of the National Objectives were recorded and none were predicted. No new or proposed local developments were predicted to give rise to potential exceedences. No need was identified for a Detailed Assessment, nor was any requirement for additional, or modified, monitoring.

The Progress Report completed in 2010 reported that there were no recorded exceedences of the national standards and there were no new developments that would impact upon local air quality. There was no identified need for a Detailed Assessment and no requirement for additional or modified monitoring.

Air quality again continued to meet the national objectives upon completion of the 2011 Progress Report. The Rowner re-development commenced in late 2009; suitable mitigation measures concerning air quality were implemented during the

planning procedure. No requirement for a Detailed Assessment was found, nor requirement for additional, or modified monitoring.

Fifth Round of Review and Assessment:

The fifth round of Review and Assessment began with the 2012 USA. No exceedences of the National Objectives were recorded and none were predicted. No new or proposed local developments that were not previously assessed were predicted to give rise to potential exceedences. A need was identified for a Detailed Assessment at Bury Cross where it was considered to be a “narrow congested street”. Passive monitoring was installed and data collected from April 2012.

The 2013 Progress Report containing the monitoring data for 2012 indicated that the annual mean NO_2 and PM_{10} objectives were achieved at all monitoring locations.

Bury Cross, a busy cross road with residential accommodation within two metres of the kerb was identified in the previous round as meeting the criteria of a ‘Narrow Congested Street’. The 2013 Progress Report includes a Detailed Assessment of the site. Diffusion tube sites were set up in places of relevant public exposure, the data from which showed no exceedences of the annual mean objective for NO_2. Further data collated from these sites will be reviewed in the next round.

The 2014 Progress Report concluded that the annual mean NO_2 and PM_{10} objectives were achieved at all monitoring locations. The continuation of the monitoring at Bury Road showed that both monitoring locations were below the annual mean objective without distance adjustment being completed.

1.4.2 Fareham Borough Council

First Round of Review and Assessment:

Between 1998 and 2001, Fareham Borough Council undertook its First Round of Review and Assessment of air quality which assessed the sources of seven air pollutants of concern to health: carbon monoxide, benzene, 1,3 butadiene, lead, nitrogen dioxide, sulphur dioxide and fine particulates (PM_{10}). The First Round assessments (Stages 1, 2 and 3) concluded that all AQS objectives were expected to be met by the target dates, based on the available information at that time.

Second Round of Review and Assessment:

The Second Round of Review and Assessment began with a USA in 2003. Fareham Borough Council completed this stage in August 2003. The report concluded that as all AQS objectives were expected to be met, a Detailed Assessment was not required.

Fareham Borough Council completed an air quality Progress Report in May 2004. The report provided an update regarding air quality monitoring with new data from 2003, and concluded that several diffusion tubes were exceeding the annual mean NO_2 objective at Osborne Road, Hartlands Road and Gosport Road (A32), South Fareham. The Council therefore proceeded to a Detailed Assessment in these areas. The assessment was carried out using detailed dispersion modelling based on traffic data provided by Hampshire County Council, and compared the results with 2004 monitoring data.

The report completed in June 2005 concluded that the annual mean NO_2 objective for 2005 would be met at Osborne Road. The modelling predicted no exceedence of the NO_2 AQS objectives in Hartlands Road although diffusion tube results at that location were showing concentrations above the annual mean objective of 40 µg/m^3. Monitoring and dispersion modelling results showed that the annual mean NO_2 objective was likely to be exceeded in both 2005 and 2010 in Gosport Road, at the junction with Newgate Lane and Redlands Lane. It was recommended that the Council install a continuous analyser to monitor NO_X and NO_2 concentrations in the area for a minimum period of 6 months, to confirm whether an AQMA should be declared. However, DEFRA required the Council to declare an AQMA without waiting for the monitoring results. Consequently, the Gosport Road AQMA was declared in April 2006, the boundaries of the AQMA can be seen in Figure 1.1. Continuous monitoring of NO_X and NO_2 concentrations was carried out between December 2005 and July 2006.

Third Round of Review and Assessment:

The Third Round of Review and Assessment began with a USA, completed in 2006. The USA included updated monitoring data for 2005 and showed that several diffusion tube results were above the annual mean NO_2 objective of 40 µg/m^3 at the

following locations (all outside the current boundaries of the Gosport Road AQMA in Fareham):

- Portland Street (PS1);
- 31 Hartlands Road (Y/HR1);
- Junction of Earl's Road and Gosport Road (G1); and
- Gosport Road (G3).

As the Council was required to proceed to a Further Assessment of the AQMA in Gosport Road, it was suggested that the assessment of the G1 and G3 locations should be incorporated. It was also concluded that as the diffusion tubes in Portland Street and Hartlands Road were not representative of public exposure, a Detailed Assessment was not required for these locations.

Further study of the area suggested that as local roads were used significantly by buses accessing the bus station in Hartlands Road, an updated traffic count should be undertaken to assist in LAQM decision making. Based on these new traffic data, it was decided to proceed to a new Detailed Assessment in Hartlands Road/Portland Street.

The Further Assessment of Gosport Road AQMA was carried out in 2007 together with the Detailed Assessment of Hartlands Road/Portland Street.

The report concluded that the Gosport Road AQMA should remain although there was no need to extend the AQMA boundaries further. The report also concluded that a new AQMA was required for NO_2 in Portland Street, following exceedences of the annual mean objective. The Portland Street AQMA was declared in December 2007. The AQMA covers an area encompassing residential properties and the Sacred Heart Catholic Church on Portland Street, this can be seen in Figure 1.2.

The Council completed an Air Quality Progress Report in March 2008. Updated monitoring data indicated that the annual mean NO_2 objective was still being exceeded in the two AQMAs.

The Further Assessment of Portland Street AQMA was completed in April 2009. Updated monitoring data and modelled results confirmed that the AQMA was still

required, as the annual mean NO_2 objective was still likely to be exceeded in this area.

The results confirmed that the extents of the AQMA were appropriate. Source apportionment showed that local traffic accounted for 55% to 60% of the overall NO_2 annual mean concentration in Portland Street (including a 30% contribution from HDVs), while local background contributions accounted for 30%. Overall it was concluded that a reduction of 70 $\mu g/m^3$ in NO_X concentration (equivalent to a 16 $\mu g/m^3$ reduction in NO_2) was required to meet the annual mean NO_2 objective.

In parallel with the Detailed and Further Assessments, the Council developed a joint Air Quality Action Plan for both AQMAs in 2008, which presented mitigation measures to help reduce NO_2 levels along Gosport Road and Portland Street.

Fourth Round of Review and Assessment:

The Fourth Round of Review and Assessment started in 2009 with a new USA. The USA 2009 concluded that, although updated NO_2 monitoring showed the annual mean NO_2 objective was still exceeded at a number of sites in the Borough, the majority of these exceedences were monitored either at sites within the AQMAs declared in Fareham for NO_2, or at sites not representative of public exposure. An exceedence of the annual mean NO_2 objective was measured at site G10, north of the AQMA in Gosport Road. As this site was located at the façade of a property, a Detailed Assessment was required.

Subsequent Detailed Assessment work concluded from further monitoring that the site of concern on Gosport Road would meet the annual mean NO_2 objective. Dispersion modelling indicated that the area of exceedence was limited to the Gosport Road and did not include the facades of any properties outside the AQMAs. Monitoring and modelling concentrations indicated that there remained exceedences of the annual mean NO_2 objective at locations relevant of public exposure within the Portland Street and Gosport Road AQMAs. From these results it was concluded that amendments of the existing AQMAs were not required.

As presented in the 2010 Air Quality Progress Report, updated monitoring results for 2009 suggested exceedences of the NO_2 annual mean objective remained in the two

AQMAs. A further site outside the AQMAs also showed an exceedence of the annual mean objective. However, the site was not representative of relevant exposure.

The 2010 Progress Report also identified new planned developments in Fareham that could impact on local air quality. These included the new food retail development at Quay Street Fareham and the proposed Bus Rapid Transit. The Council committed to further monitoring in these locations to assess their impact. One future development which was noted in the report was the Strategic Development Area of 10,000 houses planned for the north of Fareham.

Updated monitoring results for 2010, presented in the 2011 Air Quality Progress Report, indicated that exceedences of the annual mean NO_2 objective continued at locations within the two AQMAs. One site outside the AQMA boundaries also showed an exceedence of the annual mean NO_2 objective; this site is representative of relevant exposure. The Council proposed to carry out an additional year of monitoring and review the situation through the 2012 USA and to make a decision at that time on the need to undertake a Detailed Assessment for this location.

The 2011 Progress Report identified no new local developments additional to those detailed in the 2010 Progress Report which were likely to lead to significant increases in any pollutant prescribed in the AQS.

Fifth Round of Review and Assessment:

The fifth round of Review and Assessment started in 2012 with a new USA. The 2012 USA outlined the diffusion tube and continuous analyser data, analysis of which showed there to be no exceedences of the NO_2 objectives at relevant locations outside or inside the existing AQMAs.

In April 2012 a new continuous automatic analyser was installed at Portland Street to measure NO_2. This was secured via a section 106 agreement with the developer of a new food retail store at Quay Street. The initial results of this are shown and discussed in this report.

The previous rounds of Review and Assessment identified no new risk of exceedences from new road sources and updated traffic data showed no significant changes in daily traffic flows. The conversion of the Quay Street roundabout to a

“throughabout” was completed in November 2011 and has resulted in traffic coming from Gosport via the A32 and out onto the M27 via Eastern Way. Traffic no longer passes through Portland Street, as such the new road layout will hopefully reduce emissions in the Portland Street AQMA. Traffic data for Quay Street indicated no need for a detailed assessment.

The 2012 USA revealed a number of new or previously unidentified local developments which could have impacted on air quality. It was determined that a Detailed Assessment would not be required for these sources.

The 2013 Progress Report revealed that the exceedences detected were all within the existing AQMAs so Detailed Assessments were not required. No new developments were identified which would have an impact on air quality.

The 2014 Progress Report revealed a number of exceedences within the existing Gosport Road and Portland Street AQMAs and one exceedence outside of the current AQMA boundaries. Site G10 which is located on Gosport Road to the north of Gosport Road AQMA marginally breached the AQS annual mean NO_2 objective. As a recent Detailed Assessment for the same site in 2010 showed no exceedences at the facades of the houses therefore it was concluded that the AQMA boundary did not need to be adjusted. No new developments were identified which would have an impact on air quality.

Figure 1.1: Gosport Road Air Quality Management Area

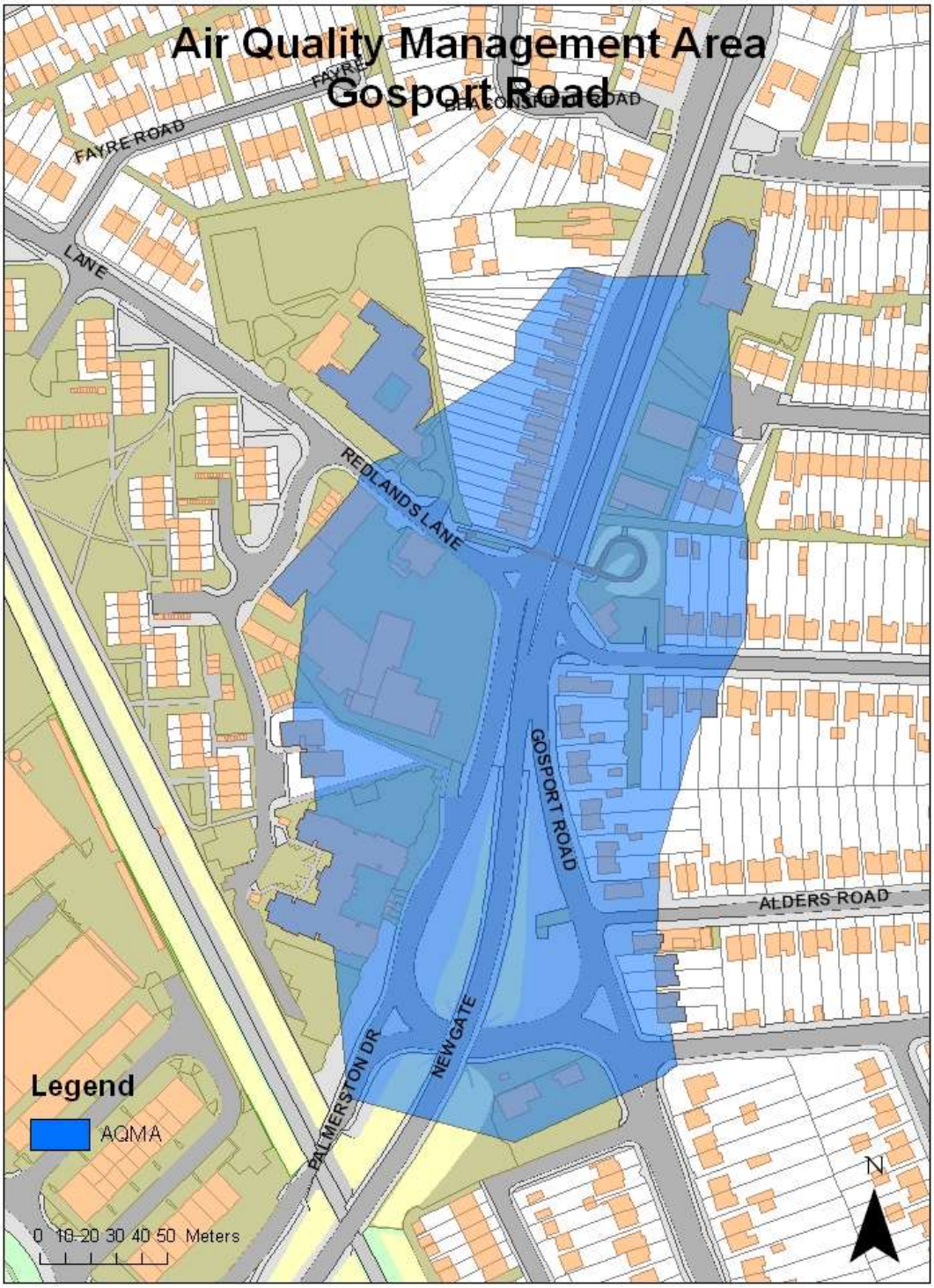
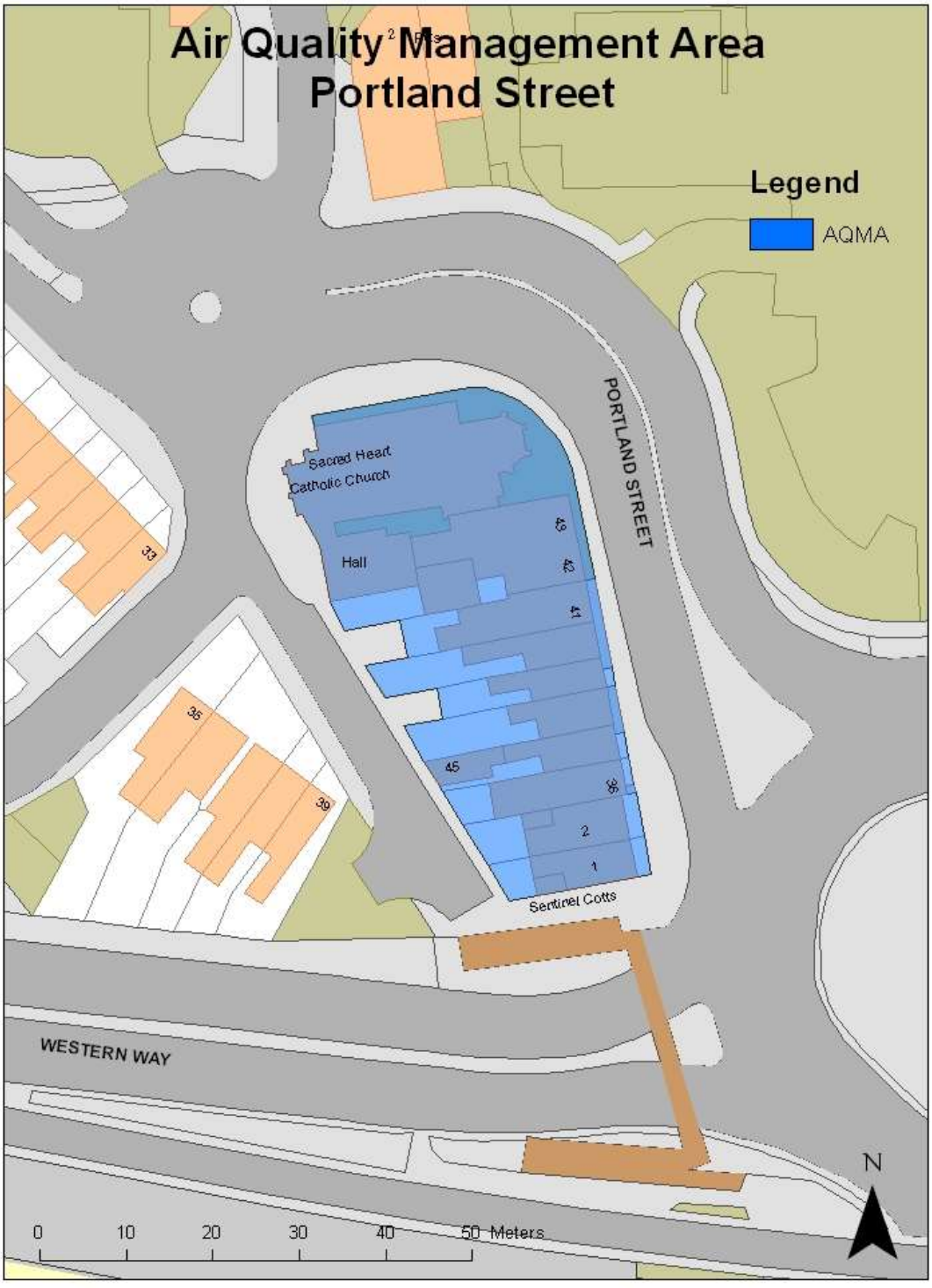


Figure 1.2: Portland Street Air Quality Management Area



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2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There are three automatic monitoring stations operated within Fareham and Gosport, these are sited at the following locations:

- Tichborne Way – Gosport Borough Council;
- Gosport Road (Elms Road) – Fareham Borough Council; and
- Portland Street – Fareham Borough Council.

The Tichborne Way monitor continuously monitors concentrations of Nitrogen Oxide (NO), Nitrogen Oxides (NOx) and Nitrogen Dioxide (NO_2) using a Chemiluminescence analyser, and Particulate Matter (PM_{10}) using a Tapered Element Oscillating Microbalance (TEOM). Weather data is also captured at the monitoring location including atmospheric pressure, temperature, wind speed and wind direction.

The Gosport Road and Portland Street monitors continuously monitor concentrations of NO, NO_x and NO_2 using Chemiluminescence analysers. Both monitors are located within AQMA's that are in force within Fareham; Gosport Road AQMA and Portland Street AQMA.

Further details of the three monitoring stations are provided in Table 2.1 and the locations are shown in Figure 2.1 and Figure 2.2.

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Figure 2.1: Map of Automatic Monitoring Site: Tichborne Way

Legend

Automatic Monitoring Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Gosport Borough Council

Title

Automatic Monitoring Site: Tichborne Way

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6291767
Date	**Figure No.**
September 2015	**2.1**

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Figure 2.2: Map of Automatic Monitoring Sites: Gosport Road and Portland Street

Legend

- Automatic Monitoring Site
- Designated AQMA

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Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Fareham Borough Council

Title

Automatic Monitoring Sites: Gosport Street and Portland Street

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6291767
Date	**Figure No.**
September 2015	**2.1**

Fareham and Gosport Environmental Health Partnership

Table 2.1: Details of Automatic Monitoring Sites

Local Authority	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(m)*	Does this location represent worst-case exposure?
Gosport Borough Council	Tichborne Way	Roadside	458987	102786	NO_2/PM_{10}	N	Chemiluminescence and TEOM	Y (15)	5	Y
Fareham Borough Council	Gosport Road	Roadside	457594	105280	NO_2	Y	Chemiluminescence	Y (3.5)	1.5	Y
	Portland Street	Roadside	457954	106027	NO_2	Y	Chemiluminescence	Y (5)	1.5	Y

2.1.2 Non-Automatic Monitoring Sites

A network of passive NO_2 diffusion tubes is in place within Fareham and Gosport at a total of seventy seven sites during 2014; twenty one sites located within Gosport Borough Council and fifty six sites located within Fareham Borough Council.

There are four locations within Fareham and Gosport where triplicate sets of diffusion tubes are located. Three of these sites are co-located with the automatic monitoring locations listed in Table 2.1 and the fourth site is located at 1 Sentinel Cottages, Fareham.

In comparison to monitoring data from 2013 there have been a number of changes to the diffusion tube monitoring network. There are an additional two sites within Gosport Borough Council:

- Wych Lane/Fareham Road; and
- Bus Stop/Wych Lane.

There are thirteen additional sites within Fareham Borough Council; sites AQ1 – AQ12, located in the Swanwick area.

For the months January to May 2014 a short survey at twelve locations was completed to assess the impact of the opening of the Yew Tree Drive bus gate at Whiteley for car use; Sites AQ1 – AQ12 (not including AQ8A). Following the completion of this survey site AQ8 has been moved to a new location close to Rosemary House, this new location (AQ8A) is to continue to monitor in line with the Fareham NO_2 diffusion tube network.

There has been no change to the triplicate or co-location monitoring sites.

The locations of the NO_2 diffusion tubes are shown in Figures 2.3-2.15, and details of the monitoring network are given in Table 2.2.

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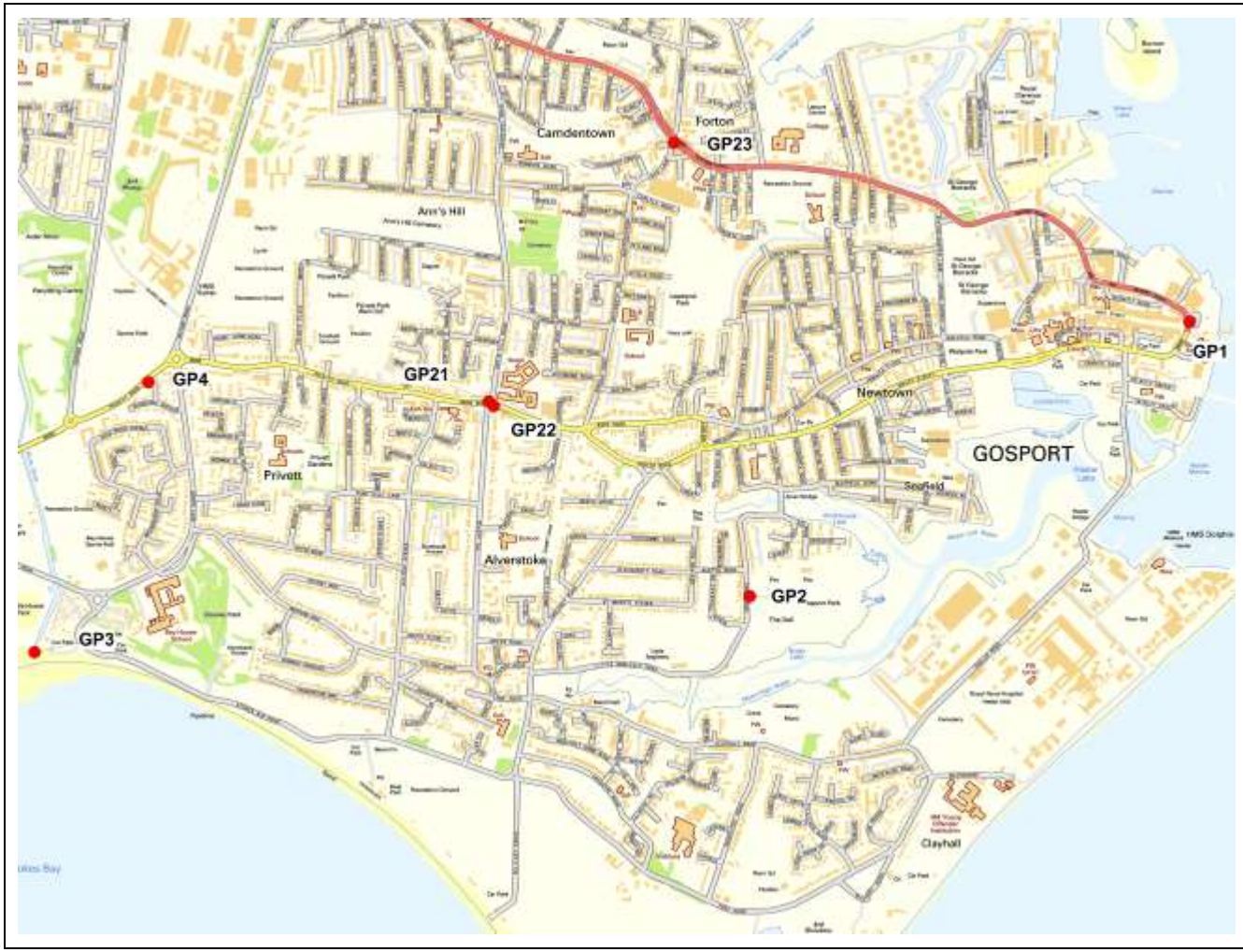
Figure 2.3: Map of Non-Automatic Monitoring Sites: Gosport 1



Legend

Diffusion Tube Site

Air Quality
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66 Prescott Street
London, E1 8HG

Location

Gosport Borough Council

Title

Non-Automatic Monitoring Sites: Gosport 1

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Figure 2.4: Map of Non-Automatic Monitoring Sites: Gosport 2

Legend

Diffusion Tube Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Gosport Borough Council

Title

Non-Automatic Monitoring Sites: Gosport 2

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Figure 2.5: Map of Non-Automatic Monitoring Sites: Gosport 3

Legend

Diffusion Tube Site

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London, E1 8HG

Location

Gosport Borough Council

Title

Non-Automatic Monitoring Sites: Gosport 3

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September 2015	**2.5**

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Figure 2.6: Map of Non-Automatic Monitoring Sites: Gosport 4

Legend

Diffusion Tube Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Gosport Borough Council

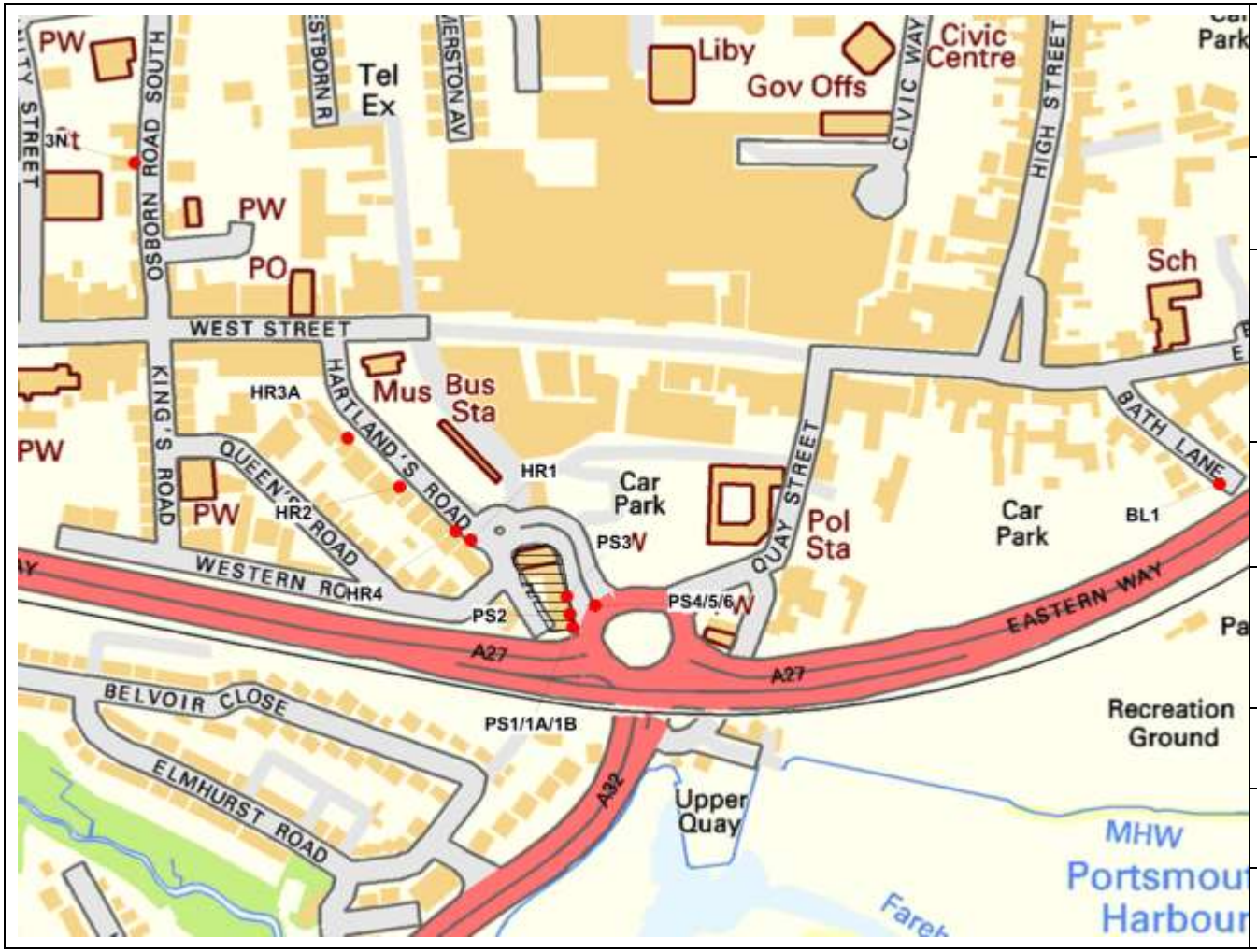
Title

Non-Automatic Monitoring Sites: Gosport 4

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6291767
Date	**Figure No.**
September 2015	**2.6**

Fareham and Gosport Environmental Health Partnership

Figure 2.7: Map of Non-Automatic Monitoring Sites: Fareham 1



Legend

Diffusion Tube Site

Designated AQMA

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Fareham Borough Council

Title

Non-Automatic Monitoring Sites: Fareham 1

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6291767
Date	**Figure No.**
September 2015	**2.7**

Fareham and Gosport Environmental Health Partnership

Figure 2.8: Map of Non-Automatic Monitoring Sites: Fareham 2

Legend

Diffusion Tube Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Fareham Borough Council

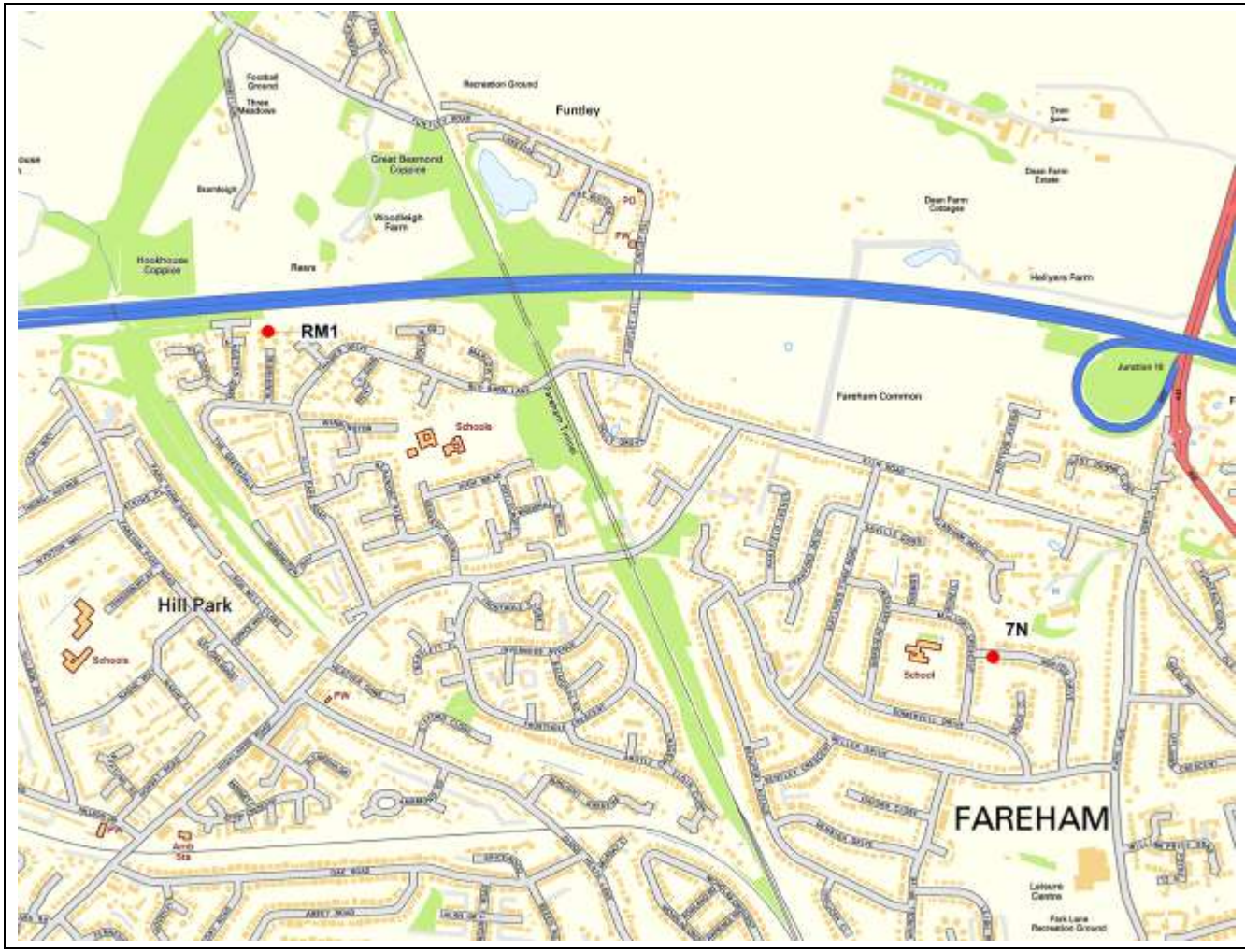
Title

Non-Automatic Monitoring Sites: Fareham 2

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6291767
Date	**Figure No.**
September 2015	**2.8**

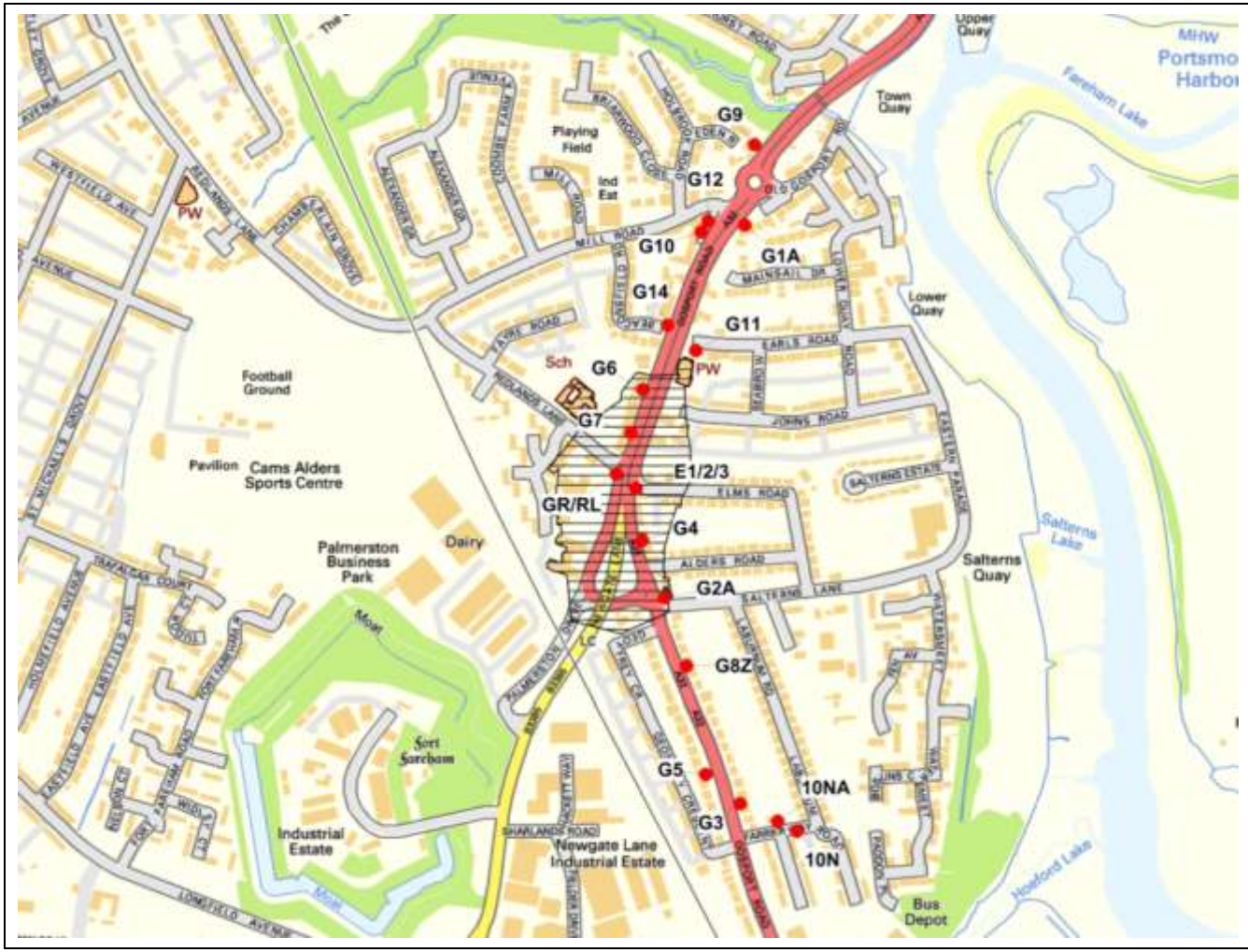
Fareham and Gosport Environmental Health Partnership

Figure 2.9: Map of Non-Automatic Monitoring Sites: Fareham 3



Fareham and Gosport Environmental Health Partnership

Figure 2.10: Map of Non-Automatic Monitoring Sites: Fareham 4



Legend

Diffusion Tube Site

Designated AQMA

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Fareham Borough Council

Title

Non-Automatic Monitoring Sites: Fareham 4

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6291767
Date	**Figure No.**
September 2015	**2.10**

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Figure 2.11: Map of Non-Automatic Monitoring Sites: Fareham 5

Legend

Diffusion Tube Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**Fareham Borough Council**
Title	**Non-Automatic Monitoring Sites: Fareham 5**
By PB	**Approved** JC
Scale Not To Scale	**Job Ref** 6291767
Date September 2015	**Figure No.** **2.11**

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Figure 2.12: Map of Non-Automatic Monitoring Sites: Fareham 6

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Figure 2.13: Map of Non-Automatic Monitoring Sites: Fareham 7

Legend

Diffusion Tube Site

Contains Ordnance Survey Data Crown Copyright and Database Right [2015]

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Fareham Borough Council

Title

Non-Automatic Monitoring Sites: Fareham 7

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6291767
Date	**Figure No.**
September 2015	**2.13**

Fareham and Gosport Environmental Health Partnership

Figure 2.14: Map of Non-Automatic Monitoring Site: Fareham 8

Legend

Diffusion Tube Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Fareham Borough Council

Title

Non-Automatic Monitoring Site: Fareham 8

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6291767
Date	**Figure No.**
September 2015	**2.14**

Fareham and Gosport Environmental Health Partnership

Figure 2.15: Map of Non-Automatic Monitoring Site: Fareham 9

Legend

Diffusion Tube Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Fareham Borough Council

Title

Non-Automatic Monitoring Sites: Fareham 9

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6291767
Date	**Figure No.**
September 2015	**2.15**

Fareham and Gosport Environmental Health Partnership

Table 2.2: Details of Non-Automatic Monitoring Sites

Local Authority	Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	In AQMA ?	Monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure?	Distance to kerb of nearest road (m)	Does this location represent worst-case exposure?
Gosport Borough Council	GP1	South Street/Mumby Road	Roadside	462259	099870	N	N	Y (15)	3	Y
	GP2	Gosport Park	Roadside	460870	099003	N	N	Y (25)	8	Y
	GP3	No 2 Battery	Urban Background	458611	098826	N	N	Y (background)	N/A	Y
	GP4	Privett Road/Military Road	Roadside	458970	099679	N	N	Y (11)	4.5	Y
	GP5	The Wildgrounds	Urban Background	458443	101054	N	N	Y (background)	N/A	Y
	GP6	Military Road/Opposite No 68	Roadside	459389	100896	N	N	Y (16.5)	3	Y
	GP7	Military Road/Brockhurst Road	Roadside	459572	101800	N	N	Y (41)	3.5	Y
	GP8	Elson Recreation Ground	Urban Background	460396	101893	N	N	Y (background)	N/A	Y
	GP9/10/11	Fareham Way/Tichborne Way	Roadside	458985	102785	N	Y	Y (16)	6	Y
	GP12	Fareham Road/Lederle Lane	Roadside	458282	104110	N	N	Y (46)	3	Y
	GP13	Wych Lane/Fareham Road	Roadside	458064	104235	N	N	N (12)	5	N
	GP14	Bus StopWych Lane	Roadside	457977	104185	N	N	N (84)	4.5	N
	GP15	Woodside	Urban Background	457744	104400	N	N	Y (6.2)	3	Y
	GP16	Curlew Walk	Urban Background	457448	103178	N	N	Y (background)	N/A	Y
	GP17	Rowner Road/The Drive	Roadside	457432	102540	N	N	Y (23)	3	Y
	GP18	Daedalus	Roadside	456564	101572	N	N	Y (15)	3m	Y
	GP19	Marine Parade/Pier Street Junction	Roadside	456242	100522	N	N	Y (11)	3m	Y
	GP20	Lee Recreation Ground	Urban Background	456612	100264	N	N	Y (background)	N/A	Y

Fareham and Gosport Environmental Health Partnership

	GP21	Bury Cross 1	Roadside	460046	099618	N	N	Y (2.3)	3.3m	Y
	GP22	Bury Cross 2	Roadside	460061	099604	N	N	Y (2.3)	3.3m	Y
	GP23	Lees Lane/Forton Road Junction	Roadside	460631	100435	N	N	Y (11)	3m	Y
Fareham Borough Council	3N	14 OsborneRoad	Roadside	457643	106326	N	N	Y (0)	6	Y
	5N	Grove Road	Roadside	457234	106329	N	N	Y (4.5)	0.5	Y
	7N	Norton Road	Urban Background	457235	107156	N	N	Y (6)	0.5	Y
	10N	Farrier Way	Urban Background	457800	104833	N	N	Y (8)	0.4	Y
	10NA	3 Farrier Way	Roadside	457775	104846	N	N	Y (0)	9.5	Y
	Av/Bf	Avenue/Bishopfields Road	Roadside	456408	106125	N	N	N	2.2	Y
	BL1	11 Bath Lane	Near Roadside	458376	106109	N	N	N	16	N
	G1A	30 Old Gosport Road	Roadside	457732	105625	N	N	Y (0)	10	Y
	G2A	138 Gosport Road	Near Roadside	457627	105138	Y	N	Y (0)	9.5	Y
	G3	202 Gosport Road	Roadside	457726	104869	N	N	Y (0)	9	Y
	G4	122 Gosport Road	Roadside	457598	105213	Y	N	Y (0)	6	Y
	G5	275 Gosport Road	Roadside	457681	104907	N	N	N	13	Y
	G6	171 Gosport Road	Roadside	457599	105410	Y	N	Y (0)	6	Y
	G7	193 Gosport Road	Roadside	457583	105354	Y	N	Y (0)	6.5	Y
	G8Z	156 Gosport Road	Roadside	457656	105049	N	N	Y (0)	4	Y
	G9	11 Eden Rise	Roadside	457745	105730	N	N	N	13	Y
	G10	107 Gosport Road	Roadside	457675	105616	N	N	Y (0)	14	Y
	G11	2 Earls Road	Roadside	457668	105461	N	N	Y (0)	5	Y
	G12	Two Saints,101 Gosport Road	Roadside	457684	105630	N	N	Y (0)	15	Y
	G14	Bottom of Beaconsfield Road	Near Roadside	457631	105494	N	N	Y (5)	6.9	Y
	HR1	Lamppost,8 Hartlands Road	Kerbside	457870	106071	N	N	Y (3.5)	1.8	Y
	HR2	17 Hartlands Road	Roadside	457822	106107	N	N	N	11	Y
	HR3A	7 Hartlands Road	Roadside	457787	106140	N	N	Y (0)	7	Y
	HR4	25 Hartlands Road	Roadside	457860	106077	N	N	Y (0)	6.5	Y

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	LH1	41 Bridge Road	Roadside	451584	108270	N	N	Y (5)	2	Y
	LH3	36 Botley Road	Roadside	451720	108361	N	N	Y (0)	5	Y
	P1B	3 The Ridgeway	Roadside	459446	106106	N	N	N	20	Y
	P2	141 The Crossways	Roadside	461134	105806	N	N	Y (10)	1	Y
	P4	22 Cams Hill	Roadside	459054	106162	N	N	N	2	Y
	P5	Silvermist, Portchester	Roadside	461139	105532	N	N	N	1.5	Y
	P6	169 West Street	Roadside	461046	105594	N	N	Y (3.5)	1.5	Y
	P7A	77 West Street, Portchester	Roadside	460272	105831	N	N	Y (5)	1.5	Y
	PS1/1A/1B	1 Sentinel Cottages	Roadside	457939	106012	Y	N	Y (0)	6.5	Y
	PS2	2 Sentinel Cottages	Roadside	457937	106021	Y	N	Y (0)	6.5	Y
	PS3	38 Portland Street	Roadside	457935	106033	Y	N	Y (0)	3.5	Y
	PS4/5/6	Co-located with Portland St Monitor	Roadside	457954	106027	Y	Y	Y (5)	1.8	Y
	S2	Stubbington Lane(Erice Road)	Roadside	455398	102811	N	N	N	2	Y
	T1	South Street Dental Health, Titchfield	Roadside	453996	105758	N	N	Y (0)	1.5	Y
	E1/2/3	Co-located with Gosport Road Monitor	Roadside	457590	105281	Y	Y	N (3.5)	1.5	Y
	DC1	Maytree Drive Opposite Delme Court	Roadside	457182	106203	N	N	N	0.5	Y
	RM1	Runnymede	Roadside	455745	107825	N	N	N	49	N
	GR/RL	Corner of Gosport Rd and Redlands Lane	Roadside	457564	105300	Y	N	Y (11)	1.5	Y
	NL11	11 Newgate Lane	Roadside	457114	102689	N	N	N	16	Y
	AQ8A	Rosemary House/Botley Road Suburban	Suburban	451618	109015	N	N	Y	8	Y
	Yew Tree Bus Gate Short Term Assessment									
	AQ1	Botley Road/Yew Tree Drive North	Roadside	451584	109374	N	N	N (9.5)	2.5	N
	AQ2	Botley Road/Yew Tree Drive South	Roadside	451615	109350	N	N	N (28)	3	N
	AQ3	Botley Road/Ashley Close	Kerbside	451514	109420	N	N	N (18)	<1	N
	AQ4	Ashley Court	Kerbside	451560	109420	N	N	N (10.5)	<1	N
	AQ5	Botley Road/Swanwick Lane	Kerbside	451408	109565	N	N	N	<1	N

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	AQ6	130 Swanwick Lane	Kerbside	450573	109567	N	N	N (3.5)	<1	N
	AQ7	Swanwick Lane/Manor Farm	Suburban	450496	109580	N	N	Y	4	Y
	AQ8	Rosemary House/Botley Road Roadside	Roadside	451610	109013	N	N	N (8)	1.5	N
	AQ9	Yew Tree Drive/Sweethills Crescent	Kerbside	451873	109527	N	N	N (14)	<1	N
	AQ10	Yew Tree Drive/Hispano Avenue	Urban Background	452250	109392	N	N	Y	20	Y
	AQ11	Botley Road/Driving School	Roadside	451434	109646	N	N	N (11)	5.5	N
	AQ12	Yew Tree Drive/Clydesdale Road	Roadside	451675	109419	N	N	N (23)	1.5	N

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

There are two AQS objectives for NO_2, namely:

- The annual mean of 40 µg/m^3; and
- The 1-hour mean of 200 µg/m^3 not to be exceeded more than 18 times per year.

Automatic Monitoring Data

There are three locations within Fareham and Gosport where NO_2 is monitored using automatic continuous monitors, these are; Tichborne Way, Gosport Road (Elms Road) and Portland Street. All of the continuous monitors are located at roadside sites.

The monitoring data is presented in Table 2.3 and Table 2.4 below. Full details of the QA/QC procedure for the automatic monitors is provided in Appendix A: QA/QC Data.

Data capture was above 75% at all three automatic monitoring sites during 2014, therefore annualisation was not required at any site.

Results for 2014 indicate that the AQS annual mean objective was met at the Tichborne Way and Gosport Road sites and exceeded at the Portland Street site. The concentration for the Portland Street site has been distance corrected to the closest relevant receptor using the Defra NO_2 Fall off With Distance Tool[1]. The 1-hour mean AQS objective was met at all three automatic monitoring sites.

Figure 2.16 shows the trend in annual mean NO_2 concentrations from 2008 to 2014 at the automatic monitoring locations (depending on when the site was installed). The only previous exceedence of the AQS annual mean objective before Portland Street in 2014 was at Gosport Road in 2010.

[1] NO_2 Fall off With Distance Tool, available online at http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

Tichborne Way showed an increase in NO_2 annual mean concentration from 2011 following a consistent annual mean between 2008 and 2011. A peak was reached in 2013 and then a decrease has been experienced between 2013 and 2014, there has been no exceedences of the AQS annual mean objective at Tichborne Way.

Gosport Road has a peak concentration in 2010 where the AQS annual mean objective was exceeded. The concentration fell from 2010 to 2011 and has remained relatively consistent between 2011 and 2014.

The annual mean concentration at Portland Street was below the annual mean AQS objective in 2012 and 2013, and slightly above (40.4 µg/m^3) in 2014. In each year of monitoring the annual mean concentration has been distance corrected due to relevant exposure being located 5m for the relevant kerbside location. For the 2012 and 2013 calculations a distance of 18m has been used, this was due to the distance being measure to the closest kerb to the automatic monitor rather than the closest kerb to the relevant exposure (both kerbs are located on the same road, Portland Street).

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Table 2.3: Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Local Authority	Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2014 %	Annual Mean Concentration (μg/m^3)						
						2008	2009	2010	2011	2012	2013	2014
Gosport Borough Council	Tichborne Way	Roadside	N	98.3	98.3	25.3	24.4	24.9	25.0	30.1	37.2	29.5
Fareham Borough Council	Gosport Road	Roadside	Y	79.3	79.3	-	35.9	**41.8**	33.2	35.5	33.8	32.5
Fareham Borough Council	Portland Street	Roadside	Y	99.5	99.5	-	-	-	-	34.9[ab]	34.6[b]	40.4[b]

[a] Data annualised for 2012 as monitoring at Portland Street began from April 2012.
[b] Data has been distance corrected.
Exceedences of the AQS NO_2 annual mean are shown in **Bold**.

Table 2.4: Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Local Authority	Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2014 %	Number of Exceedences of Hourly Mean (200 μg/m^3)						
						2008	2009	2010	2011	2012	2013	2014
Gosport Borough Council	Tichborne Way	Roadside	N	98.3	98.3	0	0	0	0	0	0	0
Fareham Borough Council	Gosport Road	Roadside	Y	79.3	79.3	0	0	0	0	0	0	0 (126)
Fareham Borough Council	Portland Street	Roadside	Y	99.5	99.5	-	-	-	-	2	7	7

[c] If the period of valid data is less than 90%, include the 99.8th percentile of hourly means in brackets.

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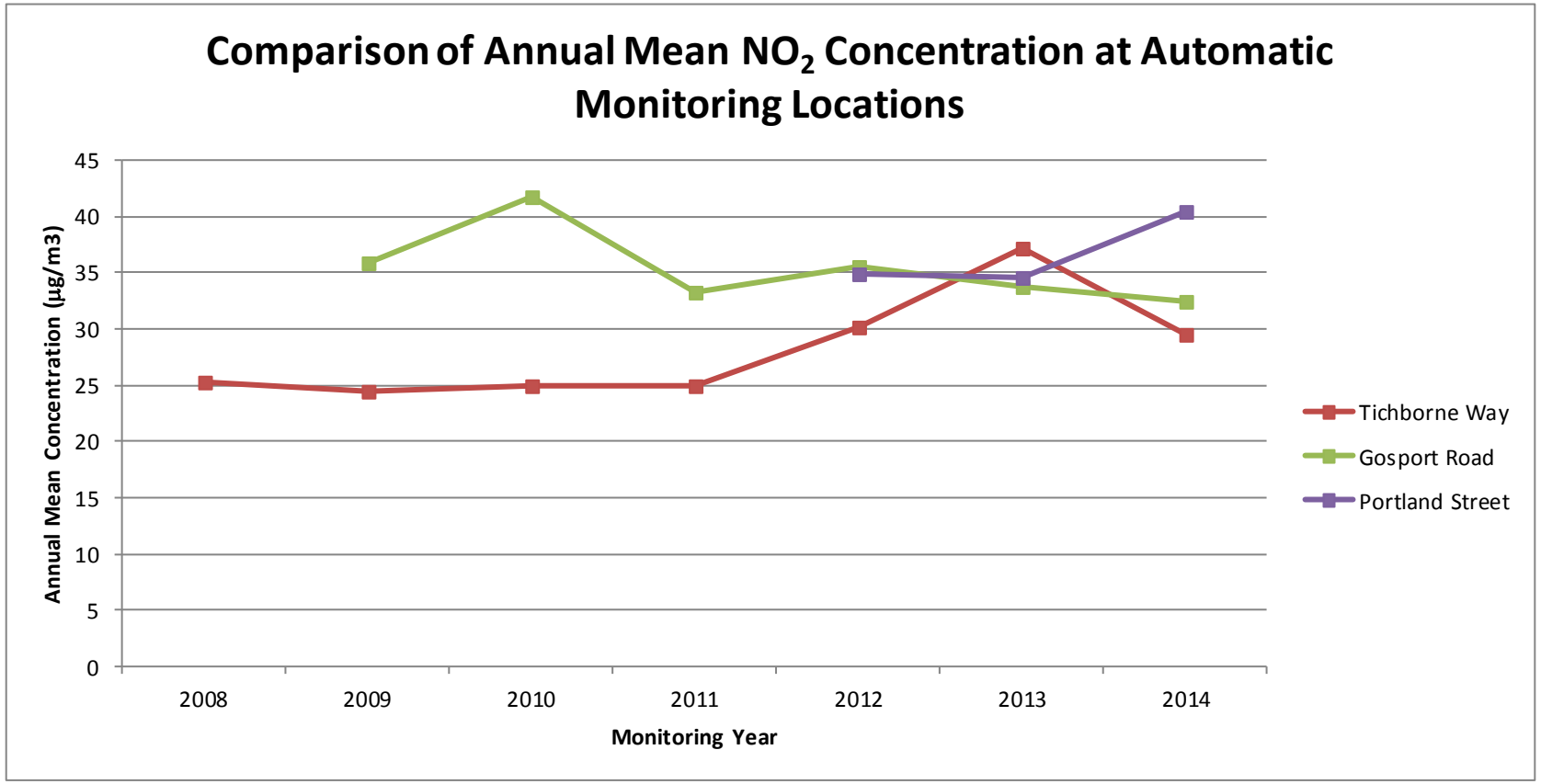
Figure 2.16: Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Automatic Monitoring Sites



Diffusion Tube Monitoring Data

Diffusion tube data obtained for the year 2014 was supplied and analysed by Gradko, the tubes were prepared using the 20% triethanolamine (TEA) in acetone preparation method. All results have been bias adjusted and a number of sites have been annualised due to data capture below 75%.

There were twenty six diffusion tube locations where data capture for 2014 was less than 75%, therefore these sites have been annualised in line with Defra Technical Guidance LAQM.TG(09) Box 3.2 (see Appendix B: Diffusion Tube Monitoring Data). In undertaking the annualisation procedure, data from three long term monitoring sites for has been used for the diffusion tubes within each Council; Portsmouth, Southampton and Bournemouth for Gosport Borough Council and Southampton, Bournemouth and Brighton for Fareham Borough Council.

The automatic monitoring sites chosen are within 50 miles of Fareham and Gosport and form part of the national Automatic Urban and Rural Network (AURN). They are all categorised as background sites; as such they are not subjected to localised effects that may occur at roadside monitoring sites. Bournemouth has not been used for the annualisation of Fareham Borough Council diffusion tubes due to a period of low data capture coinciding with the months where there was no recorded diffusion tube data.

It is necessary to apply a bias adjustment factor to NO_2 diffusion tube results. This is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter being a more accurate method of monitoring. The Defra Technical Guidance LAQM.TG(09) provides guidance with regard to the application of a bias adjustment factor to adjust diffusion tube results.

Co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data from continuous NO_x/NO_2 analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method where there are no local co-location studies.

There are triplicated sets of diffusion tubes co-located with each of the three automatic monitoring stations located in Fareham and Gosport. Bias factors have been derived from each of the co-location studies as follows;

- Tichborne Way – 1.12;
- Gosport Road – 0.90; and
- Portland Street – 1.09.

In addition the national bias factor derived from the national database for Gradko 20% TEA diffusion tubes based on 21 studies is 0.91.

The bias adjustment factors that have been used to adjust the 2014 NO_2 diffusion tube data are the national bias adjustment factor of 0.91 for Gosport Borough Council and the local bias adjustment factor of 1.09 for Fareham Borough Council. Full details of the local bias adjustment procedure are provided in Appendix A: QA/QC Data.

The results of annual mean NO_2 concentrations measured with diffusion tubes in 2014 after annualisation and bias adjusted are reported in Table 2.5 and Table 2.6. Monthly results of NO_2 concentrations without bias adjustment or annualisation completed are also provided in Appendix B: Diffusion Tube Monitoring Data.

The results of NO_2 diffusion tube data (2008 – 2014) are presented in Table 2.8 and Table 2.9 and a number of charts displaying the changing trends in annual mean NO_2 concentration over the past six years are presented in Figure 2.17, Figure 2.18, Figure 2.19 and Figure 2.20.

The results of the diffusion tube data for 2014 show that were exceedences of the AQS NO_2 annual mean objective at eleven diffusion tube locations within Fareham and Gosport; four within the existing AQMAs and seven located outside of the existing AQMAs.

Exceedences of the AQS annual mean objective were observed at G7, PS2, PS3 and PS4/5/6 (co-located with the Portland Street automatic monitor) located within the existing AQMAs in Fareham Borough Council. The concentration at the Portland Street automatic monitor had been distance corrected, therefore the concentrations of PS4/5/6 have been distance corrected to provide consistency between the two

results. The additional three sites have all exceeded the annual mean objective in previous years monitoring, with both G7 and PS3 exceeding for all years from 2012 to 2014. These sites are located within the Gosport Road and Portland Street AQMAs it is therefore recommended that both of the AQMAs within Fareham Borough Council should remain.

The diffusion tube sites that exceeded the annual mean objective outside of existing AQMAs are as follows:

- GP12 – Fareham Road/Lederle Lane (Gosport);
- BL1 – 11 Bath Lane (Fareham);
- G10 - 107 Gosport Road (Fareham);
- G12 – 101 Gosport Road (Fareham);
- HR1 - 8 Hartlands Road (Fareham)
- AQ3 – Botley Road/Ashley Close (Fareham); and
- AQ8 – Rosemary House/Botley Road Roadside (Fareham).

This is an increase of four exceedences of the NO_2 AQS annual mean objective outside of the designated AQMAs compared to 2013. GP12, AQ3 and AQ8 had data capture of less than 75% and therefore, their results have been annualised, and so should be treated with caution.

The monitoring sites AQ3 and AQ8 were part of a short term five month survey that has been completed to assess the impact of newly opening the Yew Tree Drive bus gate at Whiteley for the use of cars. This assessment is summarised under the section Yew Tree Bus Gate Short Term Monitoring Survey.

Of the locations outside of designated AQMAs where exceedences were recorded, only sites G10 and G12 are located close to relevant exposure. The concentrations of the other sites where exceedences have occurred have therefore been distance corrected to estimate the concentration at the location of relevant exposure, as shown in Table 2.2.

Sites BL1, G10 and G12 have not been distance corrected, G10 and G12 due to the diffusion tubes being located at relevant exposure and BL1 due to there being no relevant exposure close to the diffusion tube location.

Following the distance correction exercise, only sites G10 and G12 were found to exceed the annual mean in 2014. G10 had also been found to be in exceedence in 2010 and 2013. G12, although not in exceedence in previous years was within 10% of the 40μg/m^3 objective in 2012 and 2013. The two sites are located on Gosport Road approximately 200m north of the boundary of the existing Gosport Road AQMA.

A Detailed Assessment was completed in 2010 at the site G10 and it was concluded from further monitoring that the site of concern on Gosport Road would meet the annual mean NO_2 objective. Within the 2014 Progress Report for Fareham Borough Council it was recommended that the site G10 be monitored and if it shows a further breach of the objective in future years, then the need to proceed to a Detailed Assessment should be examined.

Due to site G10 exceeding the annual mean objective again in 2014 and the exceedence at site G12 that is in close proximity to G10, it is recommended that a Detailed Assessment is completed to further assess the concentration of NO_2 in the area north of the existing AQMA shown in Figure 1.1 and Figure 2.10 on Gosport Road.

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Table 2.5: Results of Nitrogen Dioxide Diffusion Tubes in 2014 - Gosport

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2014 Annual Mean Concentration ($\mu g/m^3$) - Bias Adjustment factor = 0.91
GP1	South Street/Mumby Road	Roadside	N	N	10	-	N	24.70
GP2	Gosport Park	Roadside	N	N	6	Y	N	16.47
GP3	No 2 Battery	Urban Background	N	N	10	-	N	12.70
GP4	Privett Road/Military Road	Roadside	N	N	8	Y	N	30.84
GP5	The Wildgrounds	Urban Background	N	N	10	-	N	9.56
GP6	Military Road/Opposite No 68	Roadside	N	N	8	Y	N	23.58
GP7	Military Road/Brockhurst Road	Roadside	N	N	9	-	N	34.35
GP8	Elson Recreation Ground	Urban Background	N	N	8	Y	N	21.49
GP9/10/11	Fareham Way/Tichborne Way	Roadside	N	Triplicate & co-located	9, 10, 9	-	N	24.68
GP12	Fareham Road/Lederle Lane	Roadside	N	N	6	Y	N	**48.12**
GP13	Wych Lane/Fareham Road	Roadside	N	N	9	-	N	26.51
GP14	Bus Stop Wych Lane	Roadside	N	N	7	Y	N	22.36
GP15	Woodside	Urban Background	N	N	6	Y	N	22.97
GP16	Curlew Walk	Urban Background	N	N	5	Y	N	18.30
GP17	Rowner Road/The Drive	Roadside	N	N	8	Y	N	31.67
GP18	Daedalus	Roadside	N	N	8	Y	N	21.68
GP19	Marine Parade/Pier Street Junction	Roadside	N	N	5	Y	N	29.03
GP20	Lee Recreation Ground	Urban Background	N	N	5	Y	N	15.66
GP21	Bury Cross 1	Roadside	N	N	9	-	N	38.91

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GP22	Bury Cross 2	Roadside	N	N	9	-	N	38.17
GP23	Lees Lane/Forton Road Junction	Roadside	N	N	7	Y	N	39.42

Exceedences of the AQS annual mean objective shown in **Bold**.

Table 2.6: Results of Nitrogen Dioxide Diffusion Tubes in 2014 – Fareham

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2014 Annual Mean Concentration (μg/m^3) - Bias Adjustment factor = 1.09
3N	14 Osborne Road	Roadside	N	N	12	-	N	26.71
5N	Grove Road	Roadside	N	N	12	-	N	27.96
7N	Norton Road	Urban Background	N	N	12	-	N	19.09
10N	Farrier Way	Urban Background	N	N	12	-	N	23.49
10NA	3 Farrier Way	Roadside	N	N	12	-	N	23.47
Av/Bf	Avenue/Bishopfields Road	Roadside	N	N	12	-	N	29.60
BL1	11 Bath Lane	Near Roadside	N	N	12	-	N	**40.82**
G1A	30 Old Gosport Road	Roadside	N	N	11	-	N	35.80
G2A	138 Gosport Road	Near Roadside	Y (GR)	N	12	-	N	34.05
G3	202 Gosport Road	Roadside	N	N	11	-	N	33.64
G4	122 Gosport Road	Roadside	Y (GR)	N	12	-	N	32.23
G5	275 Gosport Road	Roadside	N	N	12	-	N	31.00
G6	171 Gosport Road	Roadside	Y (GR)	N	12	-	N	37.40
G7	193 Gosport Road	Roadside	Y (GR)	N	12	-	N	**46.16**
G8	156 Gosport Road	Roadside	N	N	12	-	N	34.26

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G9	11 Eden Rise	Roadside	N	N	10	-	N	29.11
G10	107 Gosport Road	Roadside	N	N	12	-	N	**40.40**
G11	2 Earls Road	Roadside	N	N	11	-	N	28.96
G12	Two Saints,101 Gosport Road	Roadside	N	N	12	-	N	**42.20**
G14	Bottom of Beaconsfield Road	Near Roadside	N	N	12	-	N	36.95
HR1	Lamppost,8 Hartlands Road	Kerbside	N	N	12	-	N	**41.62**
HR2	17 Hartlands Road	Roadside	N	N	12	-	N	34.33
HR3A	7 Hartlands Road	Roadside	N	N	12	-	N	30.15
HR4	25 Harlands Road	Roadside	N	N	12	-	N	33.79
LH1	41 Bridge Road	Roadside	N	N	12	-	N	28.11
LH3	36 Botley Road	Roadside	N	N	11	-	N	31.20
P1B	3 The Ridgeway	Roadside	N	N	11	-	N	26.48
P2	141 The Crossways	Roadside	N	N	12	-	N	23.84
P4	22 Cams Hill	Roadside	N	N	12	-	N	30.13
P5	Silvermist, Portchester	Roadside	N	N	10	-	N	27.36
P6	169 West Street	Roadside	N	N	12	-	N	26.11
P7A	77 West Street,Portchester	Roadside	N	N	12	-	N	21.93
PS1/1A/1B	1 Sentinel Cottages	Roadside	Y (PS)	Triplicate	12, 11, 12	-	N	38.65
PS2	2 Sentinel Cottages	Roadside	Y (PS)	N	12	-	N	**41.31**
PS3	38 Portland Street	Roadside	Y (PS)	N	10	-	N	**45.99**
PS4/5/6	Co-located with Portland St Monitor	Roadside	Y (PS)	Triplicate & co-located	12, 12, 12	-	N	**46.55**
S2	Stubbington Lane(Erice Road)	Roadside	N	N	12	-	N	26.73
T1	South Street Dental Health, Titchfield	Roadside	N	N	11	-	N	27.74

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E1/2/3	Co-located with Gosport Road Monitor	Roadside	Y (GR)	Triplicate & co-located	12, 12, 12	-	N	39.62
DC1	Maytree Drive Opposite Delme Court	Roadside	N	N	12	-	N	30.11
RM1	Runnymede	Roadside	N	N	12	-	N	29.46
GR/RL	Corner of Gosport Rd and Redlands Lane	Roadside	Y (GR)	N	12	-	N	28.62
NL11	11 Newgate Lane	Roadside	N	N	12	-	N	23.14
AQ8A	Rosemary House/Botley Road Suburban	Suburban	N	N	5	Y	N	27.84
Yew Tree Bus Gate Short Term Assessment								
AQ1	Botley Road/Yew Tree Drive North	Roadside	N	N	5	Y	N	33.74
AQ2	Botley Road/Yew Tree Drive South	Roadside	N	N	5	Y	N	37.05
AQ3	Botley Road/Ashley Close	Kerbside	N	N	5	Y	N	**40.51**
AQ4	Ashley Court	Kerbside	N	N	5	Y	N	38.64
AQ5	Botley Road/Swanwick Lane	Kerbside	N	N	4	Y	N	34.53
AQ6	130 Swanwick Lane	Kerbside	N	N	5	Y	N	31.03
AQ7	Swanwick Lane/Manor Farm	Suburban	N	N	5	Y	N	34.15
AQ8	Rosemary House/Botley Road Roadside	Roadside	N	N	4	Y	N	**41.08**
AQ9	Yew Tree Drive/Sweethills Crescent	Kerbside	N	N	4	Y	N	27.68
AQ10	Yew Tree Drive/Hispano Avenue	Urban Background	N	N	5	Y	N	19.98

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AQ11	Botley Road/Driving School	Roadside	N	N	5	Y	N	33.36
AQ12	Yew Tree Drive/Clydesdale Road	Roadside	N	N	4	Y	N	34.62

Exceedences of the AQS annual mean objective shown in **Bold**.
GR – Gosport Road AQMA
PS – Portland Street AQMA

Table 2.7: Fall-off with Distance Correction of Sites Exceeding the NO_2 Annual Mean Objective

Site ID	Bias Adjusted NO_2 Annual Mean at Monitoring Site ($\mu g/m^3$)	Distance to Kerb from Monitoring Site (m)	Distance from Kerb to Receptor (m)	Local Annual Mean NO_2 Background ($\mu g/m^3$)	Predicted Annual Mean NO_2 at Receptor ($\mu g/m^3$)
PS4/5/6	**46.55**	1.5	5	22.45	40.2
GP12	**48.12**	3	46	20.04	28.3*
HR1	**41.62**	1.8	3.5	22.45	38.7
AQ3	**40.51**	1	18	24.59	31.2
AQ8	**41.08**	1.5	8	24.59	35.0

* Caution should be taken interpreting the above results as the distance from the kerb to the receptor is greater than 20m.
Exceedences of the AQS annual mean objective shown in **Bold**.

Table 2.8: Results of Nitrogen Dioxide Diffusion Tubes (2010 to 2014) - Gosport

Site ID	Site Type	Within AQMA?	Annual Mean Concentration ($\mu g/m^3$) - Adjusted for Bias				
			2010 (Bias Adjustment Factor = 0.92)	2011 (Bias Adjustment Factor = 0.92)	2012 (Bias Adjustment Factor = 0.96)	2013 (Bias Adjustment Factor = 0.95)	2014 (Bias Adjustment Factor = 0.91)
GP1	Roadside	N	21.00	24.90	26.87	30.20	24.70
GP2	Roadside	N	16.60	16.50	18.66	25.00	16.47[a]
GP3	Urban Background	N	17.57	15.93	16.66	18.08	12.70
GP4	Roadside	N	28.00	23.10	29.24	30.38	30.84[a]

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GP5	Urban Background	N	14.73	8.85	11.65	11.57	9.56
GP6	Roadside	N	18.10	16.80	19.82	22.54	23.58[a]
GP7	Roadside	N	20.40	23.00	36.13	34.55	34.35
GP8	Urban Background	N	15.83	19.80	18.55	20.34	21.49
GP9/10/11	Roadside	N	22.70*	21.70*	23.54	28.19	24.68
GP12	Roadside	N	32.40	21.50	27.30	**47.48**	28.3[ab]
GP13	Roadside	N	-	-	-	-	26.51
GP14	Roadside	N	-	-	-	-	22.36[a]
GP15	Urban Background	N	19.40	20.70	20.82	19.52	22.97[a]
GP16	Urban Background	N	17.20	14.51	12.88	16.07	18.30[a]
GP17	Roadside	N	20.3	19.3	28.09	27.23	31.67[a]
GP18	Roadside	N	-	-	16.06	20.11	21.68[a]
GP19	Roadside	N	22.80	18.70	21.57	22.91	29.03[a]
GP20	Urban Background	N	16.48	15.36	18.93	14.80	15.66[a]
GP21	Roadside	N	-	-	35.57	36.10	38.91
GP22	Roadside	N	-	-	37.52	39.33	38.17
GP23	Roadside	N	28.70	34.10	36.92	35.10	39.42[a]

Exceedences of the AQS annual mean objective shown in **Bold**.
* The site became a triplicate location in 2012, before this was a single diffusion tube location.
[a] Data has been annualised due to data capture being less than 75%.
[b] Data has been distance corrected.

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Table 2.9: Results of Nitrogen Dioxide Diffusion Tubes (2010 to 2014) – Fareham

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (μg/m^3) - Adjusted for Bias					
			2009 (Bias Adjustment Factor = 0.84)	2010 (Bias Adjustment Factor = 1.01)	2011 (Bias Adjustment Factor = 0.85)	2012 (Bias Adjustment Factor = 0.98)	2013 (Bias Adjustment Factor = 0.98)	2014 (Bias Adjustment Factor = 1.09)
3N	Roadside	N	23.5	26.6	21.1	24.68	25.00	26.71
5N	Roadside	N	25.0	27.6	22.8	26.76	24.75	27.96
7N	Urban Background	N	17.7	20.8	16.5	18.45	20.34	19.09
10N	Urban Background	N	22.2	24.3	21.2	24.20	22.69	23.49
10NA	Roadside	N	21.5	24.5	18.7	21.36	22.97	23.47
Av/Bf	Roadside	N	21.8	29.9	21.8	26.49	27.97	29.60
BL1	Near Roadside	N	-	-	30.7	35.88	38.48	**40.82**
G1A	Roadside	N	30.7	34.7	28.5	32.14	33.46	35.80
G2A	Near Roadside	Y (GR)	**40.6**	**41.5**	27.3	29.90	32.14	34.05
G3	Roadside	N	26.4	30.7	25.4	30.20	30.81	33.64
G4	Roadside	Y (GR)	26.4	30.5	24.8	28.81	29.21	32.23
G5	Roadside	N	25.4[a]	33.5[a]	23.5	26.17	28.87	31.00
G6	Roadside	Y (GR)	28.3	32.9	29.1	34.18	35.87	37.40
G7	Roadside	Y (GR)	33.2	39.6	33.6	**40.57**	**40.08**	**46.16**
G8Z	Roadside	N	25.7	31.0	26.9	32.24	33.44	34.26
G9	Roadside	N	25.1	28.5	24.7	26.28	28.82	29.11
G10	Roadside	N	35.5	**40.8**	32.0	37.48	**40.50**	**40.40**
G11	Roadside	N	25.9	28.7	24.3	29.23	29.61	28.96
G12	Roadside	N	-	-	32.2	37.00	37.35	**42.20**
G14	Near Roadside	N	-	-	29.2	33.29	36.59	36.95
HR1	Kerbside	N	38.2	**41.8**	35.9	38.50	37.80	38.7[c]

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Site ID	Site Type	Within AQMA?	Annual Mean Concentration (μg/m^3) - Adjusted for Bias					
			2009 (Bias Adjustment Factor = 0.84)	2010 (Bias Adjustment Factor = 1.01)	2011 (Bias Adjustment Factor = 0.85)	2012 (Bias Adjustment Factor = 0.98)	2013 (Bias Adjustment Factor = 0.98)	2014 (Bias Adjustment Factor = 1.09)
HR2	Roadside	N	28.2	32.5	27.6	32.06	34.00	34.33
HR3A	Roadside	N	25.2	34.8	23.2	27.28	29.46	30.15
HR4	Roadside	N	26.4	30.7	26.0	28.52	31.73	33.79
LH1	Roadside	N	23.8	27.3	22.8	27.10	27.63	28.11
LH3	Roadside	N	31.3	31.4	25.9	30.11	30.56	31.20
P1B (was P1A)	Roadside	N	20.8	24.0	20.2	23.07	23.60	26.48
P2	Roadside	N	21.2	23.7	20.3	21.72	24.09	23.84
P4	Roadside	N	26.0	28.9	25.5	29.14	28.02	30.13
P5	Roadside	N	21.2	23.7	24.6	29.26	31.34	27.36
P6	Roadside	N	26.0	28.9	21.0	25.70	25.26	26.11
P7A (was P7)	Roadside	N	27.7	22.5	17.0	20.11	22.41	21.93
PS1/1A/1B	Roadside	Y (PS)	36.0	**42.0**	34.8	35.05	36.99	38.65
PS2	Roadside	Y (PS)	38.7	**43.3**	35.8	35.84	36.01	**41.31**
PS3	Roadside	Y (PS)	**42.0**	**47.9**	35.0	**40.43**	**41.60**	**45.99**
PS4/5/6	Roadside	Y (PS)	-	-	-	32.60	34.77	**40.2**[b]
S2	Roadside	N	22.3	27.3	19.8	23.24	26.78	26.73
T1	Roadside	N	20.6	28.1	21.8	23.97	26.13	27.74
E1/2/3	Roadside	Y (GR)	36.5	**41.8**	33.0	36.70	36.93	39.62
DC1	Roadside	N	25.3	29.1	24.2	28.25	30.28	30.11
RM1	Roadside	N	-	-	21.7	28.97	29.48	29.46
GR/RL	Roadside	Y (GR)	-	-	-	26.55	28.43	28.62
NL11	Roadside	N	-	-	-	22.94	21.90	23.14
AQ8A	Suburban	N	-	-	-	-	-	27.84[a]

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Site ID	Site Type	Within AQMA?	Annual Mean Concentration (μg/m^3) - Adjusted for Bias					
			2009 (Bias Adjustment Factor = 0.84)	2010 (Bias Adjustment Factor = 1.01)	2011 (Bias Adjustment Factor = 0.85)	2012 (Bias Adjustment Factor = 0.98)	2013 (Bias Adjustment Factor = 0.98)	2014 (Bias Adjustment Factor = 1.09)
Yew Tree Bus Gate Short Term Assessment								
AQ1	Roadside	N	-	-	-	-	-	33.74[a]
AQ2	Roadside	N	-	-	-	-	-	37.05[a]
AQ3	Kerbside	N	-	-	-	-	-	31.2[ab]
AQ4	Kerbside	N	-	-	-	-	-	38.64[a]
AQ5	Kerbside	N	-	-	-	-	-	34.53[a]
AQ6	Kerbside	N	-	-	-	-	-	31.03[a]
AQ7	Suburban	N	-	-	-	-	-	34.15[a]
AQ8	Roadside	N	-	-	-	-	-	35.0[ab]
AQ9	Kerbside	N	-	-	-	-	-	27.68[a]
AQ10	Urban Background	N	-	-	-	-	-	19.98[a]
AQ11	Roadside	N	-	-	-	-	-	33.36[a]
AQ12	Roadside	N	-	-	-	-	-	34.62[a]

Exceedences of the AQS annual mean objective shown in **Bold**.
* The site became a triplicate location in 2012, before this was a single diffusion tube location.
[a] Data has been annualised due to data capture being less than 75%.
[b] Data has been distance corrected.

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Figure 2.17: Trends in Annual Mean NO_2 Concentrations measured at Diffusion Tube Monitoring Sites – Gosport

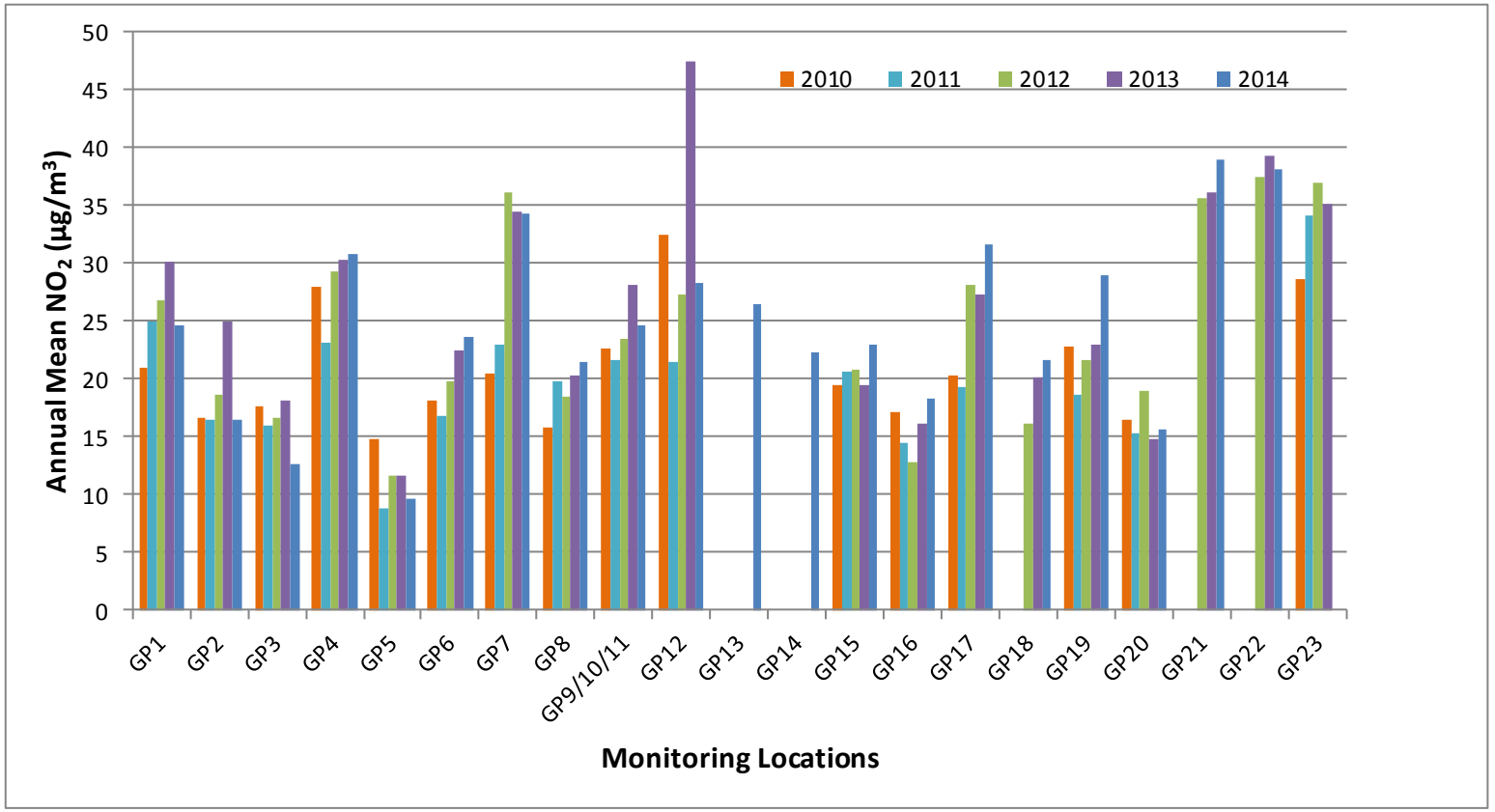

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Figure 2.18: Trends in Annual Mean NO_2 Concentrations measured at Diffusion Tube Monitoring Sites – Fareham (1)

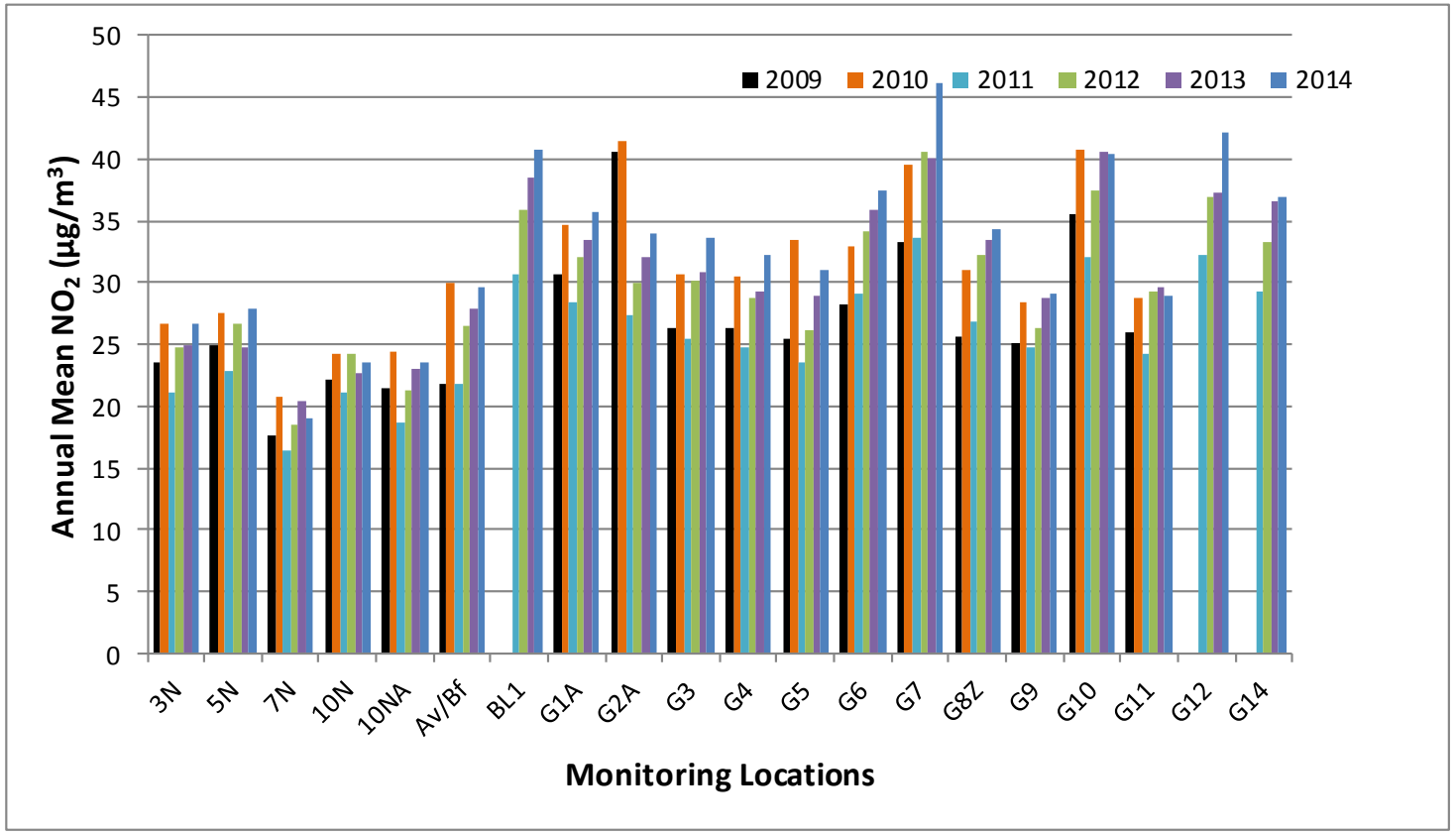

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Figure 2.19: Trends in Annual Mean NO_2 Concentrations measured at Diffusion Tube Monitoring Sites – Fareham (2)

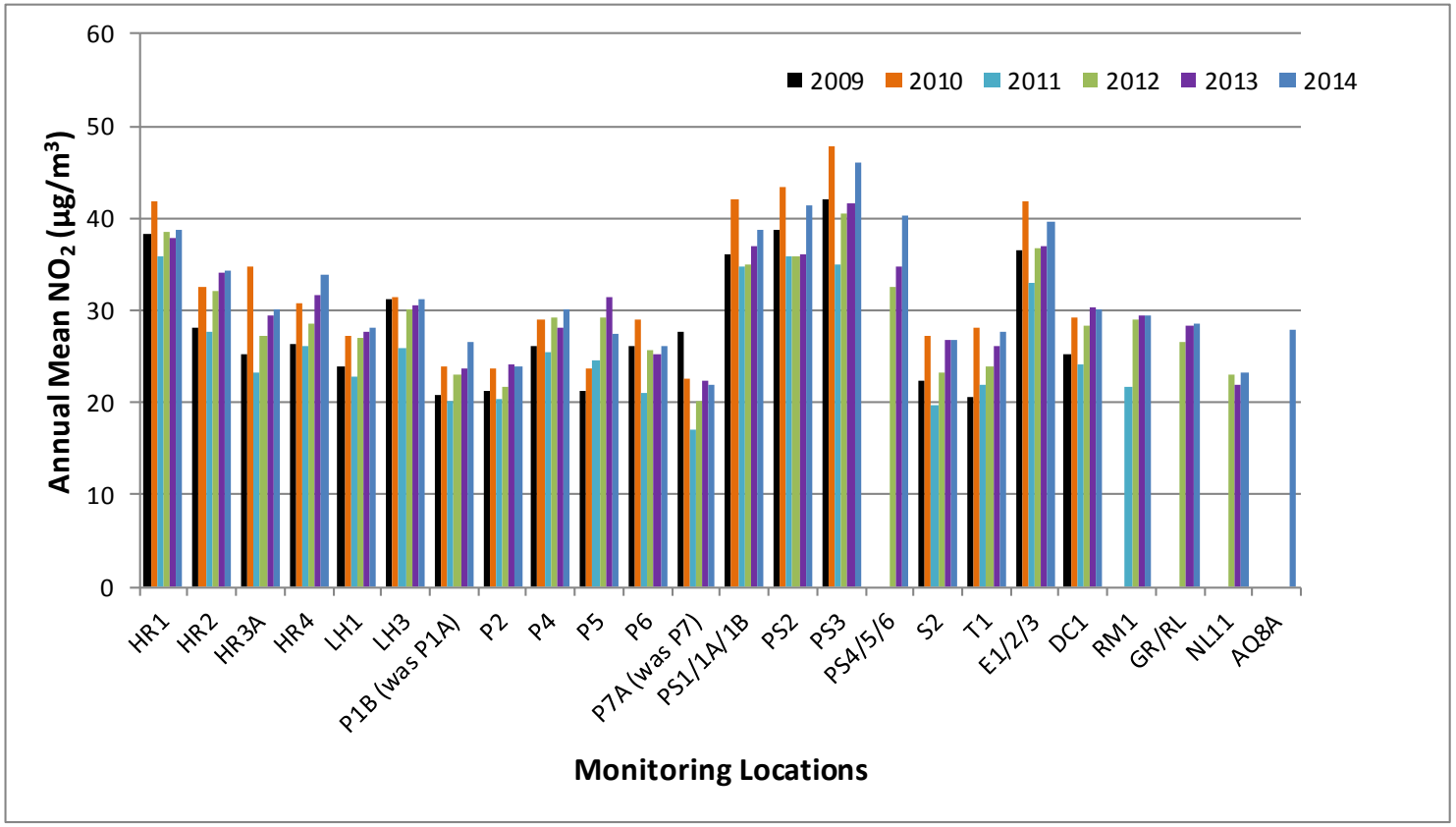

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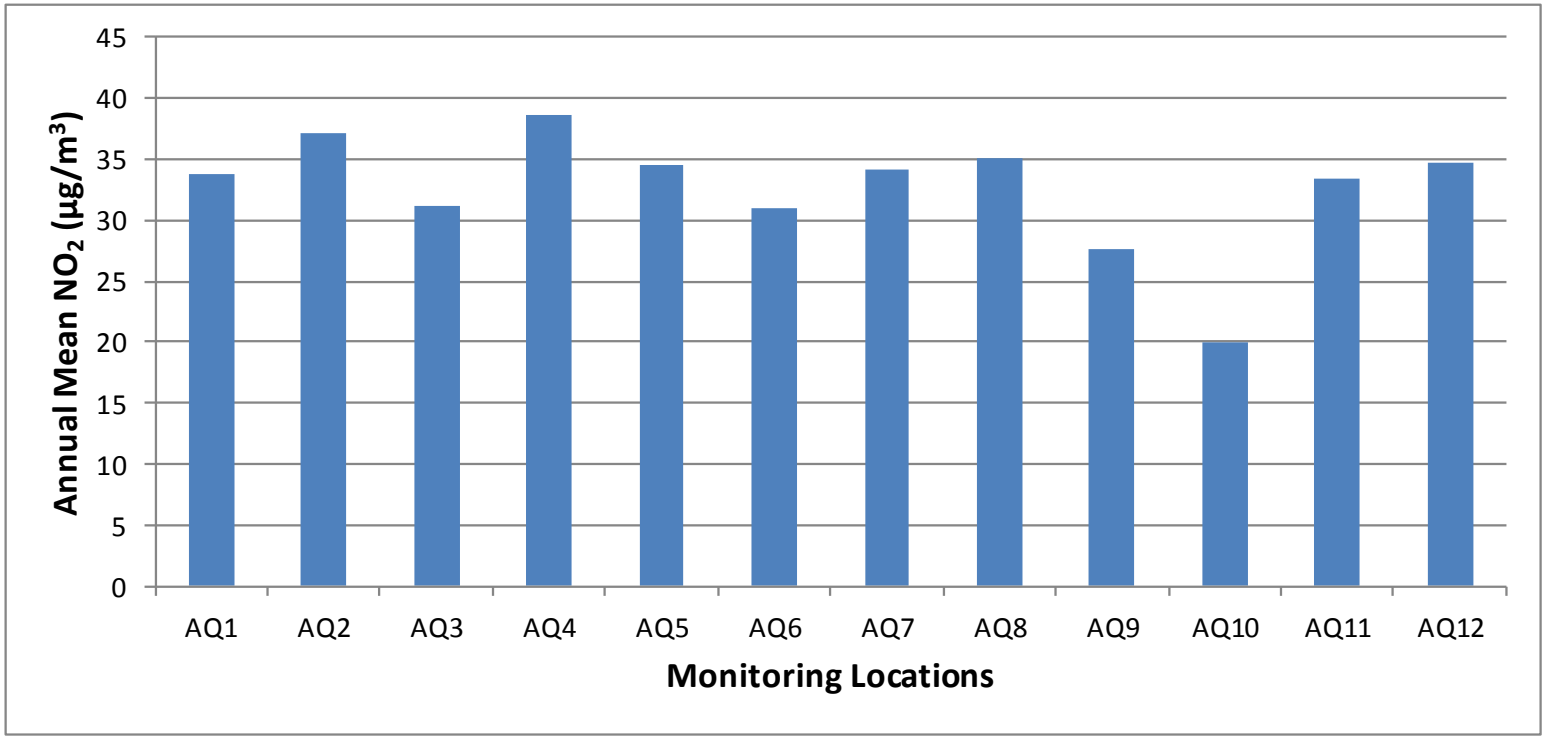
Figure 2.20: Trends in Annual Mean NO_2 Concentrations measured at Fareham Short Term Locations



The trend graphs presented above show the changing NO_2 concentration at all diffusion tube monitoring sites located within Fareham and Gosport from the year monitoring began at that position to 2014. There is not a clear trend across all monitoring sites, with instances of both increases and decreases in annual mean concentration. The NO_2 annual mean AQS objective has been exceeded at six locations, four of these locations have exceeeded in previous years and two have exceeded for the first time (BL1 and G12) since monitoring began. In comparison to 2013, there was an increase of fifteen monitoring sites in 2014 and there was an increase in the monitoring locations that exceeded the annual mean objective in 2014 (7) compared to 2013 (4).

Yew Tree Bus Gate Short Term Monitoring Survey

A planning application was submitted by Hampshire County Council in 2013 for the opening of the Yew Tree Drive bus gate at Whiteley for car use. Permission was granted for a trail opening period of three months that commenced on the 28th of February 2014.

An air quality survey was completed from January to May 2014 to monitor the concentration of NO_2 at relevant locations of public exposure. Assessment of the monitoring data was completed by CH2M Hill on behalf of Hampshire County Council. Upon completion of the assessment the May monitoring concentrations were not yet available, averages have been taken for the sites over the monitoring period and the average has not been bias adjusted.

It was reported in the assessment that one monitoring site (AQ8) was slightly above the AQS annual mean objective for NO_2. Site AQ8 is described as being 95m north of the M27 motorway and the assessment states that the concentration monitored will have been affected by emissions from the motorway. In conclusion the assessment states that the opening of the Yew Tree Drive Bus Gate does not currently lead to a breach of the AQS objective for NO_2.

The short term monitoring sites used for the Yew Tree Drive assessment have been annualised and bias adjusted in line with LAQM in provide an additional assessment of the monitoring results, the results are presented in Figure 2.20. Exceedences of the AQS annual mean NO_2 objective were recorded for Sites AQ3 and AQ8. Following distance correction using the NO_2 Fall off With Distance calculator presented in Table 2.7 both sites have been shown to be below the annual mean AQS objective at the location of relevant exposure.

Monitoring is to continue at Site AQ8A located close to the previously sited diffusion tube at Rosemary House (AQ8) in line with Fareham Borough Councils NO_2 diffusion tube network.

Bury Road Detailed Assessment

Monitoring at relevant locations of public exposure on Bury Road commenced in 2012 following a Detailed Assessment completed due to the identification of a ‘narrow congested street’. Two NO_2 diffusion tubes were located at the site (GP21

and GP22) and data started to be collected in April 2012, these locations were chosen as the 'points of maximum relevant public exposure' as recommended in Defra Technical Guidance TG(09).

Monitoring data collected from 2012 and 2013 showed that there were no exceedences of the AQS annual mean at either location, therefore no detailed modelling was necessary.

The monitoring completed during 2014 at GP21 and GP22 is shown below in Table 2.10. Data capture was good for both sites therefore annualisation was not required. Both sites were found to be below the AQS annual mean objective without distance adjustment being completed.

Table 2.10: 2014 Bury Road NO_2 Results

Location	Data Capture	Annualised	Distance Corrected	NO_2 Annual Mean Concentration ($\mu g/m^3$
GP21 Bury Road 1 (next to house)	75%	N	N	38.91
GP22 Bury Road 2 (next to sweet shop)	75%	N	N	39.42

Particulate Matter (PM_{10})

There are two AQS objectives for PM_{10}, namely:

- The annual mean of 40 µg/m^3; and
- The 24-hour mean of 50 µg/m^3 not to be exceeded more than 35 times a year.

PM_{10} monitoring was undertaken at the Tichborne Way roadside automatic monitoring site during 2014 using a TEOM analyser. The PM_{10} monitoring data is presented in Table 2.11 and Table 2.12 below. Results for the TEOM have been corrected using the Volatile Correction Model (VCM)[2]. Full details of the QA/QC procedure are provided in Appendix A: QA/QC Data.

The trend graph presented as Figure 2.21 shows that in 2014 both the highest annual mean concentration and the highest number 24-hour mean exceedences occurred since monitoring began at the site. The annual mean has increased since its lowest concentration was recorded in 2012, rising in both 2013 and 2014. The number of 24-hour mean exceedences had decreased from 2011 to 2013 but increased to its highest amount in 2014.

The 2014 PM_{10} results show that the annual mean and the 24-hour mean continue to meet the AQS objectives at the Tichborne Way monitoring site.

[2] Volatile Correction Model – Used to correct TEOM measurements for the loss of volatile components of particulate matter that occur to the high sampling temperatures employed by this instrument.

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Table 2.11: Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Local Authority	Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2014 %	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m^3					
							2009	2010	2011	2012	2013	2014
Gosport Borough Council	Tichborne Way	Roadside	N	95.1	95.1	Y	20.3	20.1	21.4	16.8	21.9	24.0

Table 2.12: Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Local Authority	Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2014 %	Confirm Gravimetric Equivalent (Y or NA)	Number of Exceedences of 24-Hour Mean (50 μg/m^3)					
							2009	2010	2011	2012	2013	2014
Gosport Borough Council	Tichborne Way	Roadside	N	95.3	95.3	Y	3	0	12	7	3	15

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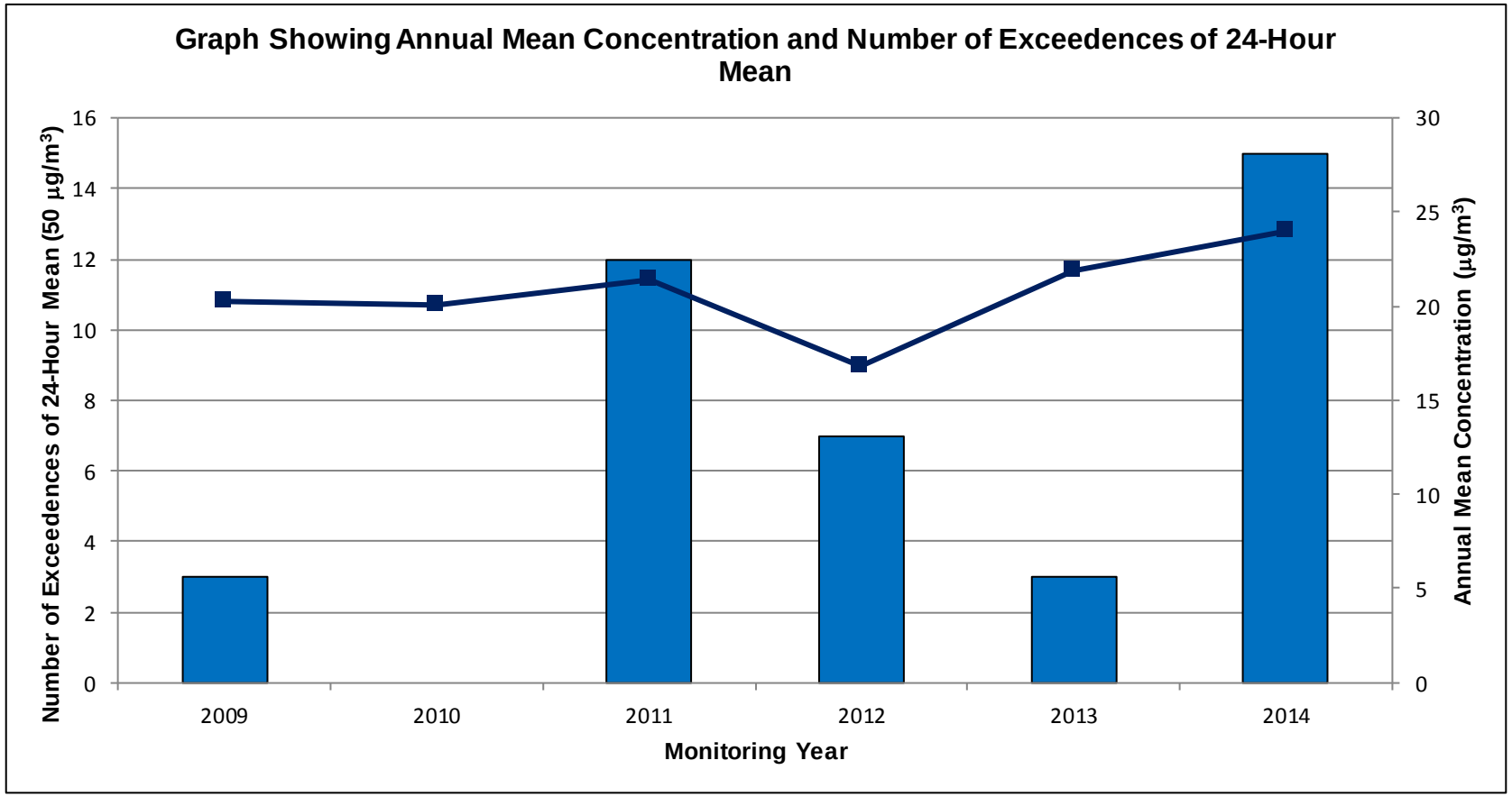
Figure 2.21: Trends in Annual Mean PM_{10} Concentrations



2.2.2 Sulphur Dioxide (SO_2)

There is currently no SO_2 monitoring completed within Fareham and Gosport.

2.2.3 Benzene (C_6H_6)

There is currently no Benzene monitoring completed within Fareham and Gosport.

2.2.4 Other pollutants monitored

No other pollutants were monitored within Fareham and Gosport during 2014.

2.2.5 Summary of Compliance with AQS Objectives

Monitoring of NO_2 and PM_{10} is completed across Fareham and Gosport using three continuous automatic monitors and a network of passive NO_2 diffusion tubes. In 2014 there have been an additional two NO_2 diffusion tube locations within Gosport Borough Council and an additional thirteen sites within Fareham Borough Council. There has been no change to the triplicate or co-location monitoring sites.

The AQS annual mean was met at the Tichborne Way and Gosport Road sites but was exceeded at the Portland Street site in 2014. The 1-hour objectives for NO_2 were not exceeded at any of the automatic monitoring locations during 2014.

There were eleven diffusion tube locations that exceeded the AQS annual mean objective for NO_2 within Fareham and Gosport during 2014, four of these sites (G7, PS2, PS3 and PS4/5/6) are within the existing Fareham Borough Council AQMAs therefore a Detailed Assessment at these locations is not required.

A further seven sites were located outside of the existing AQMAs within Fareham and Gosport, following distance correction using the NO_2 Fall off With Distance Tool there were two sites with relevant exposure that exceeded the annual mean objective, G10 and G12. A previous Detailed Assessment completed in 2010 for site G10 showed that there were no exceedences at the facades of the residential receptors, therefore the boundary of the AQMA was not adjusted. Due to the 2014 exceedences at sites G10 and G12, and previous exceedences at site G10 it is recommended that a Detailed Assessment be completed to assess the concentration at relevant residential receptors close to the diffusion tube sites. Upon completion of the Detailed Assessment the boundary of the Gosport Road AQMA shown in Figure

1.1 and Figure 2.10 should be assessed and adjusted if relevant exceedences are identified.

Results from 2014 show that the PM_{10} annual mean and the 24-hour mean continue to meet the AQS objectives at the Tichborne Way monitoring site in Gosport Borough Council.

A summary of monitoring compliance with the AQS objectives for Fareham and Gosport is provided in Table 2.13.

Table 2.13: Summary of Compliance with AQS Objectives

Pollutant	General	New Exceedences identified?	Detailed Assessment Required	Objective	Description of Area and Details
Gosport Borough Council					
NO_2	Monitoring outside AQMAs	Yes	No	Annual Mean	Fareham Road/ Tichborne Way DT (GP12). Exceedence not relevant to receptors when concentration distance corrected, therefore Detailed Assessment is not required.
	Monitoring inside AQMAs	N/A	N/A	-	-
PM_{10}	Monitoring outside AQMAs	No	No	-	-
	Monitoring inside AQMAs	N/A	N/A	-	-
All other pollutants	Monitoring outside AQMAs	N/A	N/A	-	-
	Monitoring inside AQMAs	N/A	N/A	-	-
Fareham Borough Council					
NO_2	Monitoring outside AQMAs	Yes	No	Annual Mean	11 Bath Lane DT (BL1). 8 Hartlands Road DT (HR1). Botley Road/ Ashley Court DT (AQ3). Rosemary House/ Botley Road DT (AQ8). Exceedences not relevant to receptors when concentration distance corrected, therefore Detailed Assessment is not required.

		Yes	No	Annual Mean	107 Gosport Road DT (G10). 101 Gosport Road DT (G12). Recommendation that a Detailed Assessment is to be completed to assess the concentration of NO_2 in the area north of the Gosport Road AQMA.
	Monitoring inside AQMAs	Yes	No	Annual Mean	Portland Street Automatic Monitoring Station. 193 Gosport Road DT (G7). 1 Sentinal Cottages DT (PS4/5/6) 2 Sentinal Cottages DT (PS2). 38 Portland Street DT (PS3). Sites are located within the existing AQMAs therefore Detailed Assessment is not required.
PM_{10}	Monitoring outside AQMAs	N/A	N/A	-	-
	Monitoring inside AQMAs	N/A	N/A	-	-
All other pollutants	Monitoring outside AQMAs	N/A	N/A	-	-
	Monitoring inside AQMAs	N/A	N/A	-	-

DT – Diffusion Tube

Fareham and Gosport Councils have measured concentrations of NO_2 above the annual mean objective at relevant locations outside of the Gosport Road AQMA within Fareham Borough Council, and **will need to proceed to a Detailed Assessment**, for the area north of the existing AQMA to be assessed.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Defra Technical Guidance TG(09) defines narrow congested streets to have the following:

- Daily traffic flow (AADT) of around 5,000 vehicles per day;
- A congested street is one that has slow moving traffic that is frequently stopping and starting through the day; and
- A narrow street is one where residential properties are within 2m of the kerb and there are buildings on both sides of the road.

A Detailed Assessment has been completed for Bury Road to assess NO_2 concentrations due to the identification of relevant exposure at locations within 2m of the kerb. Monitoring has commenced at two locations close to Bury Road and to date there have been no measured exceedences of the AQS annual mean objective for NO_2.

No new roads have been identified within Fareham and Gosport as meeting the above criteria.

Fareham and Gosport Councils confirm that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

There will be some street locations where individuals may regularly spend 1-hour or more, for example streets with many shops and streets with outdoor cafes and bars. People occupationally exposed in such locations should not be included, as they are not covered by the regulations.

No busy streets have been identified within Fareham and Gosport as meeting these criteria.

Fareham and Gosport Councils confirm that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

A road with a high flow of buses of HGV's would be one where the proportion of these vehicles within the daily traffic flow is greater than 20%.

Fareham and Gosport Councils confirm that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

Defra Technical Guidance TG(09) states that for a junction to require assessment the flowing criteria must be met:

- A 'busy' junction can be taken to be one with more than 10,000 vehicles per day; and
- There is relevant exposure within 10m of the kerb.

Fareham and Gosport Council confirm that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

A new road where an air quality assessment has not been completed as part of the planning application should be assessed using the following criteria as per Defra Technical Guidance TG(09):

- Only proceed if there is relevant exposure within 10m, 20m in major conurbations (population is greater than 2 million);
- Establish whether the traffic flow on the new road is greater than 10,000 vehicles per day or whether the new road has increased traffic flow on existing roads previously identified as having:
  - NO_2 annual mean concentrations greater than 36 µg/m^3; or
  - More than 30, 24-hour exceedences of the PM_{10} objective of 50 µg/m^3.

A planning application has been received for the construction of the proposed Stubbington Bypass (P/15/0718). The proposed bypass would run from Titchfield Road (south of Titchfield Gyratory) in the west, to Gosport Road (west of Peel Common Roundabout in the east). In support of the planning application an Environmental Impact Assessment (EIA) has been completed with Chapter 5 of the Environmental Statement (ES) covering the impact of the proposed scheme upon air quality.

Dispersion modelling using the Atmospheric Dispersion Modelling System (ADMS) has been completed to assess the impact of the proposed scheme on relevant receptors located close to the scheme. The assessment has been based upon predicted traffic numbers in order to assess possible changes in NO_2 and PM_{10} concentrations close to the scheme. In addition the impacts from the construction of the scheme have been assessed in accordance with current Institute of Air Quality Management (IAQM) guidance.

The assessment concluded that the construction of the proposed scheme would have temporary, short-medium term, local effects on air quality which would have little to no impact as a result of mitigation. It was stated that overall the proposed scheme will have a slightly beneficial impact upon air quality during its operation.

Works are being undertaken at the northern end of Newgate Lane between Longfield Avenue and Tanners Lane. The works are to relieve congestion on the A32 encompassing changes to two roundabouts, expanding the road to two lanes in both directions and revising the access to HMS Collingwood. The scheme has been designed to provide beneficial impacts upon congestion and vehicle emissions.

Fareham and Gosport Councils have assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.6 Roads with Significantly Changed Traffic Flows

Fareham and Gosport Councils confirm that there have been no roads with a traffic flow greater than 10,000 vehicles per day that have experienced an increase in traffic flow of more than 25%.

Fareham and Gosport Councils confirm that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

The assessment considers both NO_2 and PM_{10} emissions at bus stations that are not enclosed with greater than 2,500 movements per day.

Fareham and Gosport Councils confirm that there are no relevant bus stations in the Local Authority areas.

4 Other Transport Sources

4.1 Airports

The criteria for Airports that require assessment as a source as stated within Defra Technical Guidance TG(09) is as follows:

- Establish whether there is relevant exposure within 1,000m of the airport boundary;
- Passenger numbers of more than 10 million passengers per annum; and
- The existing NO_x background concentration is greater than 25 µg/m^3.

Fareham and Gosport Borough Councils confirm that there are no airports in the Local Authority areas.

4.2 Railways (Diesel and Steam Trains)

The assessment for stationary trains considers SO_2 emissions, while the assessment for moving trains also considers NO_2 emissions. The specific criteria for Railways (stationary and moving) that require assessment as stated within Defra Technical Guidance TG(09) is as follows:

- Any locations where diesel/steam trains are regularly stationary for periods of 15 minutes or more;
- There is the potential for regular outdoor exposure of individuals within 15m of the stationary locomotives; and
- Where the existing NO_2 background concentration is above 25 µg/m^3.

4.2.1 Stationary Trains

Stationary locomotives, both diesel and coal fired, can give rise to high levels of SO_2 close to the point of emission. Railway locomotives have not been identified in previous rounds of review and assessment as being a significant source of SO_2 within Fareham and Gosport.

Fareham and Gosport Borough Councils confirm that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Rail lines with a heavy traffic of diesel passenger trains are listed in the Defra Technical Guidance TG(09) and on the Defra website for Guidance on Assessing Emissions from Railway Locomotives[3]. Of the lines that are listed, none pass through Fareham and Gosport Borough Councils.

Fareham and Gosport Borough Councils confirm that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

The specific criteria for ports (shipping) that require assessment as stated within Defra Technical Guidance TG(09) should include the following:

- Relevant exposure within either 250m or 1km of the berths and main areas of ship manoeuvring;
- Ship movements of between 5,000 and 15,000 per year for relevant exposure within 250m; and
- Ship movements of more than 15,000 per year for relevant exposure within 1km.

Fareham and Gosport Borough Councils confirm that there are no ports or shipping that meet the specified criteria within the Local Authority areas.

5 Industrial Sources

5.1 Industrial Installations

This report has assessed any changes to the following since the last Updating and Screening Assessment:

- New or proposed installations for which an air quality assessment has been carried out;
- Existing installations where emissions have increased substantially or new relevant exposure has been introduced;
- New or significantly changed installations with no previous air quality assessment;
- Major fuel storage depots storing petrol;
- Petrol stations; and
- Poultry farms.

Fareham Borough Council currently regulates twenty six process that are covered by environmental permitting (ten petrol stations, seven dry cleaners, three vehicle coating processes, two concrete crushing processes, two waste oil burning plants, a non-ferrous metal foundry and a crematorium.

Gosport Borough Council currently regulates nine processes that are covered by environmental permitting (four petrol stations, two dry cleaners, a concrete batching plant, a printing facility and a waste oil burning plant.

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Fareham and Gosport Councils confirm that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

As per Defra Technical Guidance TG(09) existing industrial installations to be taken into account should include the following criteria:

- Installation has experienced an increase in emissions by greater than 30%; and
- New relevant exposure has been identified in the vicinity of the installation.

Fareham and Gosport Councils confirm that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Fareham and Gosport Councils confirm that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority areas.

5.3 Petrol Stations

The specific criteria for petrol stations that require assessment as stated within Defra Technical Guidance TG(09) is a petrol station with the following:

- An annual throughput of more than 2,000m^3 of petrol;
- A busy road nearby, one with more than 30,000 vehicles per day; and
- Relevant receptors within 10m of the refuelling pumps.

Fareham and Gosport Borough Councils confirm that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

Studies have been conducted by the Environmental Agency, Department for Environment Northern Island and a local authority. From the studies completed the following guidance has been produced as to the assessment of poultry farms:

- Identify any farms housing in excess of:
  - 400,000 birds if mechanically ventilated;

  - 200,000 birds if naturally ventilated; and
  - 100,000 birds for any turkey farm.
- Establish whether there is any relevant exposure within 100m of the poultry farms.

Fareham and Gosport Borough Councils confirm that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Biomass burning plant with a thermal capacity of between 50kW and 200MW are required to be assessed.

Fareham and Gosport Borough Councils confirm that there are no new biomass combustion plant in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

There have been no new biomass combustion plant within Fareham and Gosport Borough Councils, therefore there are no new combined impacts.

Fareham and Gosport Borough Councils confirm that there are no new biomass combustion plant in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

Assessment of domestic solid fuel burning is required in areas where ‘significant’ coal or smokeless fuel burning takes place, ‘significant’ is defined as any area of roughly 500x500m with more than 50 houses burning coal/smokeless fuel as their primary source of heating.

In previous Review and Assessment reports there have been no areas identified within Fareham and Gosport that have a high density of domestic solid fuel burning. There have been no changes since the last round of Review and Assessment.

Fareham and Gosport Borough Councils confirm that there are no areas of significant domestic fuel use in the Local Authority area.

Fugitive or Uncontrolled Sources

The assessment of fugitive or uncontrolled sources considers only PM_{10} AQS objectives. The assessment considers but is not limited to the following sources of dust; quarries, landfill sites, opencast coal mining, waste transfer sites, materials handling (i.e. ports, major construction sites). Only sources with planning approval granted need to be considered. An assessment should only be completed if there are locations that haven't been covered by previous rounds of Review and Assessment or where there is new relevant exposure.

Relevant exposure is defined within the Defra Technical Guidance TG(09) using the following criteria as to whether there is exposure 'near' to the source:

- Within 1000m for a local PM_{10} background concentration > 28 µg/m^3;
- Within 400m for a local PM_{10} background concentration between 26 and 28 µg/m^3; and
- Within 200m for a local PM_{10} background concentration < 26 µg/m^3.

The airfield formally known as HMS Daedalus is currently in the planning stages for the redevelopment of the site to include industrial, commercial and residential uses. Applications have been made to both Fareham and Gosport Councils due to the proposed development falling over the administrative boundary between the two.

An EIA has been completed for the proposal and within the ES air quality impacts are assessed in terms of construction activities and the operational scheme. Construction activities were concluded to be of minor significance and mitigation measures are proposed within a Construction Environmental Management Plan to be agreed. The impacts of the operational scheme are considered to be of neutral significance, concentrations of NO_2 and PM_{10} are anticipated to increase as a result of the development however they will remain within the national air quality objectives.

Any changes to the planning application will continue to be assessed through the planning procedure and within further rounds of Review and Assessment where required.

The residential, commercial and industrial development located north of Fareham known as Welborne has been identified in previous LAQM reports. To date a planning application has not been received relating to this development therefore it will be taken into consideration in future LAQM reports.

Fareham and Gosport Borough Councils confirm that there are no potential sources of fugitive particulate matter emissions in the Local Authority areas.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Monitoring of NO_2 and PM_{10} is completed within Fareham and Gosport utilising continuous automatic monitors and passive NO_2 diffusion tubes. There are three continuous monitors and a total of seventy seven diffusion tubes in place during 2014; twenty one sites within Gosport Borough Council and fifty six sites within Fareham Borough Council. Included within the fifty six sites in Fareham there are twelve locations that were part of a five month short term study.

A review of the 2014 NO_2 monitoring data found that there as exceedence of the AQS annual mean objective at the Portland Street automatic monitor and at eleven diffusion tube monitoring sites; G7, PS2, PS3, PS4/5/6, GP12, BL1, G10, G12, HR1, AQ3 and AQ8. There were no exceedences of the AQS 1-hour mean objective at any of the three automatic monitors and none of the diffusion tubes had an annual mean greater than 60 µg/m^3, therefore there are no diffusion tube sites likely to be at risk of exceeding the 1-hour mean AQS objective.

Of the eleven sites where exceedences occurred, four of the locations are within the designated AQMAs and seven of the locations are located outside of the AQMAs; GP12, BL1, HR1, G10, G12, AQ3 and AQ8. Where necessary the sites were corrected to relevant exposure using the NO_2 Fall off With Distance Calculator. This resulted in exceedences at relevant exposure at sites G10 and G12.

Site G10 has exceeded the AQS annual mean NO_2 objective in previous LAQM reports, this resulted in a Detailed Assessment being completed in 2009 to assess NO_2 concentrations at residential receptors close to G10. The Detailed Assessment concluded that there were no exceedences of any AQS objectives at any relevant receptor locations. Due to the sites G10 and G12 exceeding in 2014 it is recommended to proceed to a Detailed Assessment to assess the current exposure at residential receptors close to both sites. Upon completion of the Detailed Assessment the Gosport Road AQMA should be assessed to whether the extent of the boundary should be extended to the north to include the area covered by sites G10 and G12.

There were no exceedences of the PM_{10} AQS objectives within Fareham and Gosport during 2014.

8.2 Conclusions from Assessment of Sources

8.2.1 Road Sources

A planning application has been received for a proposed bypass at Stubbington (P/15/0718). As part of the application an EIA has been completed to assess the impact of the scheme on the surrounding area. The assessment of air quality impacts concluded that there would be little to no impact from construction related activities with the implementation of mitigation and best practice measures, and there would be a slight beneficial impact overall on the surrounding area from the operation of the scheme.

8.2.2 Industrial Installations

There has been a reduction in the number of permitted activities within Fareham and Gosport since the previous USA. There are twenty six processes that are covered by environmental permitting within Fareham Borough Council and nine processes within Gosport Borough Council.

8.2.3 Fugitive or Uncontrolled Sources

There are two developments that have been previously identified within LAQM reports as potential large scale developments that have the potential to impact local surroundings through fugitive or uncontrolled sources; Daedalus airfield and the Welborne development.

An application has previously been submitted for Daedalus including an EIA and ES chapter assessing the impacts of the development on local air quality in Fareham and Gosport. The construction activities were concluded to be of minor significance when mitigation and best practice measures were implemented. The operational impacts were assessed to be of neutral significance with a rise in NO_2 and PM_{10} predicted, but with no predicted exceedences of the AQS objectives.

To this date an application has not been received for the development planned at the Welborne site, if received this will be assessed within the planning application process and within future LAQM reports.

8.3 Proposed Actions

The proposed actions from the Fareham and Gosport 2015 Updating and Screening Assessment are as follows:

- Continue to undertake both automatic and passive monitoring of NO_2 and PM_{10} to identify future trends in concentration and any exceedences of the AQS objectives;
- Continue to monitor at Bury Street as a continuation of the Bury Street Further Assessment;
- The Gosport Road and Portland Street AQMAs will be retained and monitoring will continue within the AQMAs to assess the need for retention of the AQMAs in the future;
- Proceed to a Detailed Assessment for the diffusion tube sites G10 and G12 to assess the NO_2 concentration at relevant residential facades;
- Upon completion of the Detailed Assessment review the boundaries of the Gosport Road AQMA; and
- Proceed to an Annual Progress Report in 2016.

References

- Local Air Quality Management Technical Guidance LAQM.TG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- National Diffusion Tube Bias Adjustment Spreadsheet, version 03/15 published in March 2015.
- http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-(April-2013--February-2015)-NO2-report.pdf
- NO_2 Fall off With Distance Tool, available at http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html
- Fareham Borough Council 2012 Updating and Screening Assessment.
- Fareham Borough Council 2014 Annual Progress Report.
- Fareham Borough Council 2013 Annual Progress Report.
- Gosport Borough Council 2012 Updating and Screening Assessment.
- Gosport Borough Council 2014 Annual Progress Report.
- Gosport Borough Council 2013 Annual Progress Report.
- Yew Tree Drive Bus Gate Trial Opening, Noise and Air Quality Monitoring Report, June 2014, produced by CH2M Hill.
- Stubbington Bypass, Environmental Statement Volume 1, June 2015, produced by WSP Parsons Brinckerhoff.
- Stubbington Bypass, Non-Technical Summary of the Environmental Statement, June 2015, produced by WSP Parsons Brinckerhoff.
- Daedalus, Environmental Statement – Volume 3 (Non-technical Summary), April 2011, produced by Campbell Reith.

Appendices

Appendix A: QA/QC Data

Appendix B: Diffusion Tube Monitoring Data

Appendix C: Distance Correction Calculations

Appendix A: QA/QC Data

Factor from Local Co-location Studies

There are four triplicated diffusion tube monitoring sites located within Fareham and Gosport, three of these are co-located at the three automatic monitoring stations. Local bias adjustment factors have been calculated from the Precision and Bias Adjustment spreadsheet (v04)[4] and are shown in Table A1 and the outputs from the spreadsheet are shown in Figures A1, A2 and A3.

Table A1: Local Bias Correction Factors

Location	Diffusion Tube Data Capture	Continuous Monitor Data Capture	Diffusion Tube Annual Mean (µg/m^3)	Continuous Monitor Annual Mean (µg/m^3)	Ratio
Tichborne Way (GP9/10/11)	83%	98.35%	27.12	29.77	1.12
Gosport Road (E1/2/3)	100%	79.12%	36.35	32.49	0.9
Portland Street (PS4/5/6)	100%	99.49%	42.71	47.02	1.09

Figure A1: Local Bias Correction Factor Output – Tichborne Way

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1	20/12/2013	23/01/2014	24.4	23.2		24	0.8	3	7.3	34.89	100	Good	Good
2	23/01/2014	06/02/2014	24.9	24.8	25.6	25	0.4	2	1.0	29.86	100	Good	Good
3	06/02/2014	19/03/2014	26.6	23.8	26.1	26	1.5	6	3.7	34.51	100	Good	Good
4	19/03/2014	10/04/2014	35.2	32.4	35.0	34	1.5	5	3.8	33.66	99.81	Good	Good
5	10/04/2014	20/05/2014	26.8	25.4	25.1	26	0.9	4	2.3	34.10	99.9	Good	Good
6	20/05/2014	06/06/2014		29.6	28.1	29	1.1	4	9.5	34.76	100	Good	Good
7	06/06/2014	09/07/2014	29.0	33.9	29.6	31	2.7	9	6.7	21.36	99.75	Good	Good
8	09/07/2014	20/08/2014	21.5	19.6	20.4	21	1.0	5	2.4	20.07	100	Good	Good
9	20/08/2014	07/10/2014	27.7	30.3	28.9	29	1.3	5	3.3	29.33	98.96	Good	Good
10													
11													
12	11/12/2014	07/01/2015	26.9	28.5	26.1	27	1.2	4	3.0	29.60	99.55	Good	Good
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey --> Good precision | Good Overall

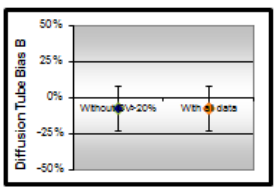
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision: 10 out of 10 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 10 periods of data
Bias factor A: 1.12 (0.95 - 1.35)
Bias B: -10% (-26% - 5%)
Diffusion Tubes Mean: 27 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 30 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 30 (26 - 37) µgm^{-3}

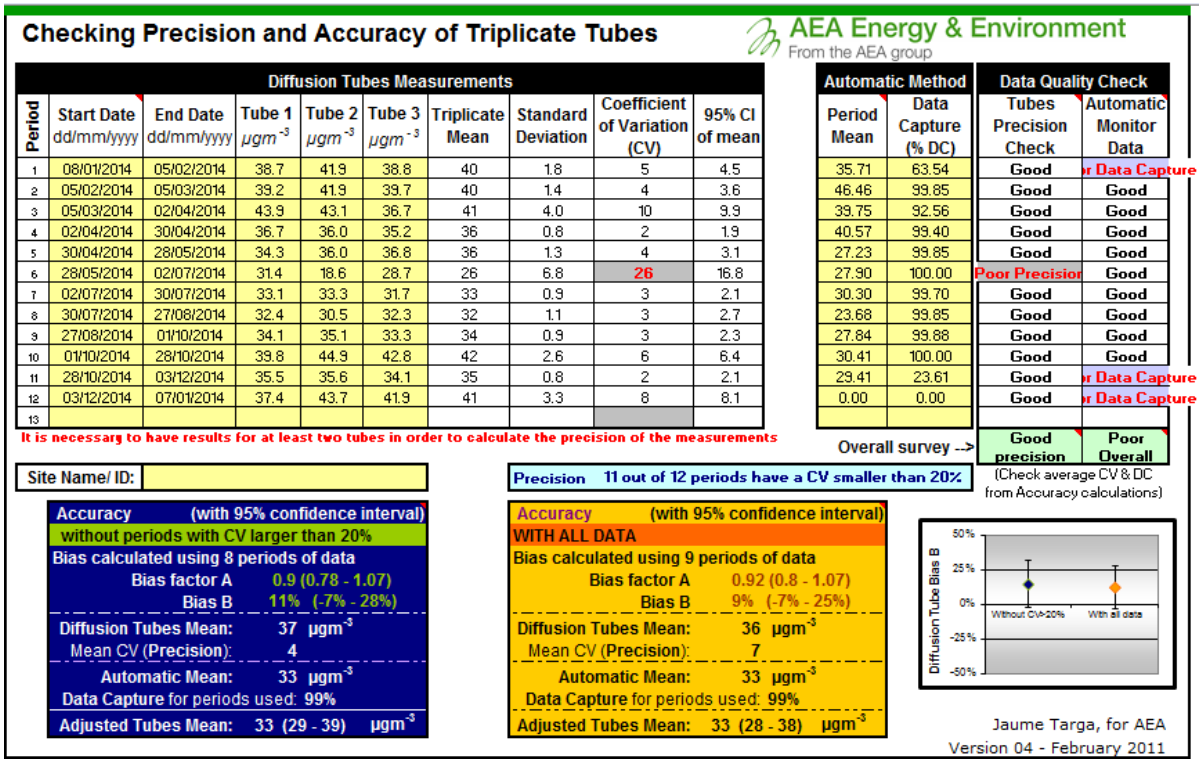
Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 10 periods of data
Bias factor A: 1.12 (0.95 - 1.35)
Bias B: -10% (-26% - 5%)
Diffusion Tubes Mean: 27 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 30 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 30 (26 - 37) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

[4] AEA_DifTPAB_v04.xls, version 04 published in February 2015

Figure A2: Local Bias Correction Factor Output – Gosport Road



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	08/01/2014	05/02/2014	38.7	41.9	38.8	40	1.8	5	4.5
2	05/02/2014	05/03/2014	39.2	41.9	39.7	40	1.4	4	3.6
3	05/03/2014	02/04/2014	43.9	43.1	36.7	41	4.0	10	9.9
4	02/04/2014	30/04/2014	36.7	36.0	35.2	36	0.8	2	1.9
5	30/04/2014	28/05/2014	34.3	36.0	36.8	36	1.3	4	3.1
6	28/05/2014	02/07/2014	31.4	18.6	28.7	26	6.8	26	16.8
7	02/07/2014	30/07/2014	33.1	33.3	31.7	33	0.9	3	2.1
8	30/07/2014	27/08/2014	32.4	30.5	32.3	32	1.1	3	2.7
9	27/08/2014	01/10/2014	34.1	35.1	33.3	34	0.9	3	2.3
10	01/10/2014	28/10/2014	39.8	44.9	42.8	42	2.6	6	6.4
11	28/10/2014	03/12/2014	35.5	35.6	34.1	35	0.8	2	2.1
12	03/12/2014	07/01/2014	37.4	43.7	41.9	41	3.3	8	8.1
13									

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
35.71	63.54	Good	r Data Capture
46.46	99.85	Good	Good
39.75	92.56	Good	Good
40.57	99.40	Good	Good
27.23	99.85	Good	Good
27.90	100.00	Poor Precision	Good
30.30	99.70	Good	Good
23.68	99.85	Good	Good
27.84	99.88	Good	Good
30.41	100.00	Good	Good
29.41	23.61	Good	r Data Capture
0.00	0.00	Good	r Data Capture
	Overall survey -->	Good precision	Poor Overall

(Check average CV & DC from Accuracy calculations)

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Site Name/ ID:

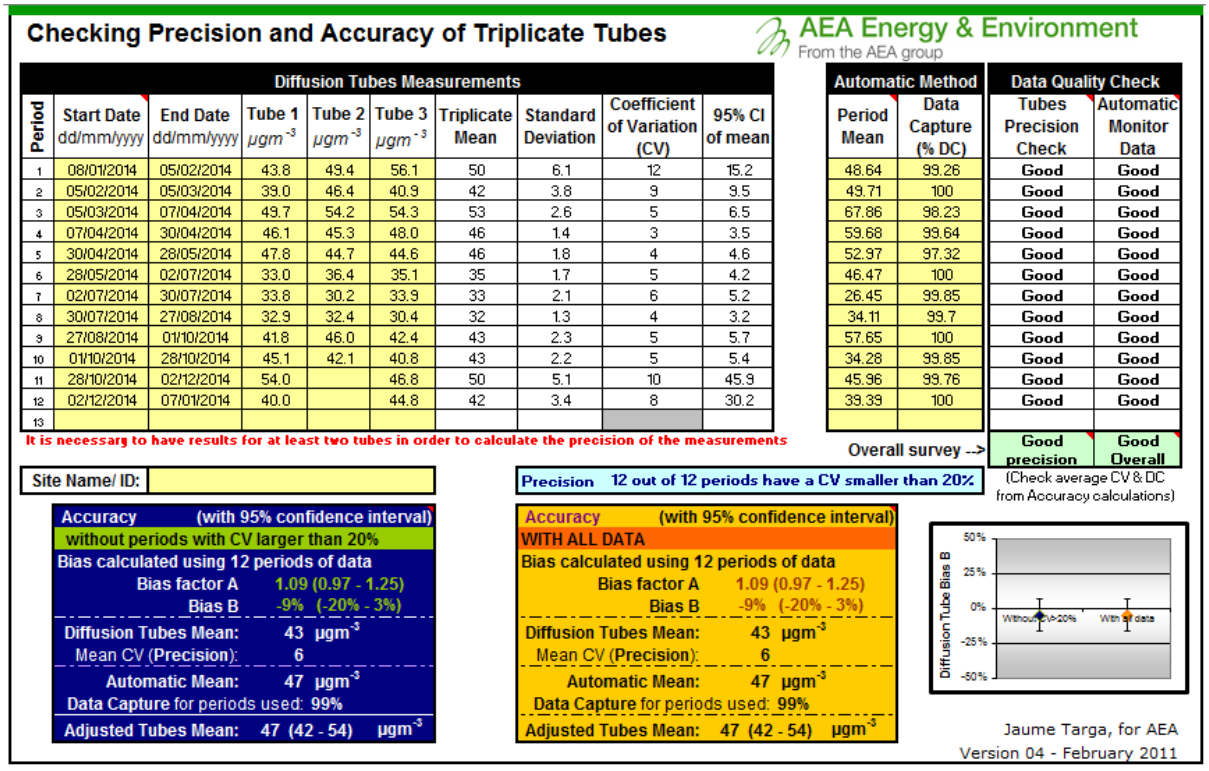
Precision 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 8 periods of data
Bias factor A 0.9 (0.78 - 1.07)
Bias B 11% (-7% - 28%)
Diffusion Tubes Mean: 37 µgm⁻³
Mean CV (Precision): 4
Automatic Mean: 33 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 33 (29 - 39) µgm⁻³

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 9 periods of data
Bias factor A 0.92 (0.8 - 1.07)
Bias B 9% (-7% - 25%)
Diffusion Tubes Mean: 36 µgm⁻³
Mean CV (Precision): 7
Automatic Mean: 33 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 33 (28 - 38) µgm⁻³

Jaume Targa, for AEA
Version 04 - February 2011

Figure A3: Local Bias Correction Factor Output – Portland Street



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	08/01/2014	05/02/2014	43.8	49.4	56.1	50	6.1	12	15.2
2	05/02/2014	05/03/2014	39.0	46.4	40.9	42	3.8	9	9.5
3	05/03/2014	07/04/2014	49.7	54.2	54.3	53	2.6	5	6.5
4	07/04/2014	30/04/2014	46.1	45.3	48.0	46	1.4	3	3.5
5	30/04/2014	28/05/2014	47.8	44.7	44.6	46	1.8	4	4.6
6	28/05/2014	02/07/2014	33.0	36.4	35.1	35	1.7	5	4.2
7	02/07/2014	30/07/2014	33.8	30.2	33.9	33	2.1	6	5.2
8	30/07/2014	27/08/2014	32.9	32.4	30.4	32	1.3	4	3.2
9	27/08/2014	01/10/2014	41.8	46.0	42.4	43	2.3	5	5.7
10	01/10/2014	28/10/2014	45.1	42.1	40.8	43	2.2	5	5.4
11	28/10/2014	02/12/2014	54.0		46.8	50	5.1	10	45.9
12	02/12/2014	07/01/2014	40.0		44.8	42	3.4	8	30.2
13									

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
48.64	99.26	Good	Good
49.71	100	Good	Good
67.86	98.23	Good	Good
59.68	99.64	Good	Good
52.97	97.32	Good	Good
46.47	100	Good	Good
26.45	99.85	Good	Good
34.11	99.7	Good	Good
57.65	100	Good	Good
34.28	99.85	Good	Good
45.96	99.76	Good	Good
39.39	100	Good	Good
	Overall survey -->	Good precision	Good Overall

(Check average CV & DC from Accuracy calculations)

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Site Name/ ID:

Precision 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A 1.09 (0.97 - 1.25)
Bias B -9% (-20% - 3%)
Diffusion Tubes Mean: 43 µgm⁻³
Mean CV (Precision): 6
Automatic Mean: 47 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 47 (42 - 54) µgm⁻³

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 1.09 (0.97 - 1.25)
Bias B -9% (-20% - 3%)
Diffusion Tubes Mean: 43 µgm⁻³
Mean CV (Precision): 6
Automatic Mean: 47 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 47 (42 - 54) µgm⁻³

Jaume Targa, for AEA
Version 04 - February 2011

Diffusion Tube Bias Adjustment Factors

Diffusion tube data obtained for the year 2014 were supplied and analysed by Gradko International Limited, the tubes were prepared using the 20% Triethanolamine (TEA) in acetone preparation method. The national bias adjustment factor for Gradko 20% TEA is 0.91 (based on 21 studies, version 06_15) as derived from the national bias adjustment calculator[5].

Discussion of Choice of Factor to Use

The diffusion tube data has been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring. The Defra Technical Guidance LAQM.TG(09) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

With regard to the application of a bias adjustment factor for diffusion tubes, the Defra Technical Guidance LAQM.TG(09) and the LAQM Helpdesk[6] recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

The national bias adjustment factor of 0.91 derived from the national bias adjustment calculator has been used to adjust the Gosport Borough Council diffusion tubes. This factor has been chosen due to previous LAQM reports using the national bias factor and due to the reduced diffusion tube data capture at the site.

The local bias adjustment factor of 1.09 derived from the co-location study at the Portland Street continuous automatic monitor has been used to adjust the Fareham Borough Council diffusion tubes. The Portland Street monitor experienced a greater data capture during 2014 compared to the Gosport Road monitor therefore it was decided to solely used the factor derived from this site. In addition due to this factor

[5] National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 06/15 published in June 2015
[6] Laqm.defra.gov.uk

being greater than the national factor and the factor derived from the Gosport Street co-location study, the local bias adjustment factor provides a worst case scenario.

For previous years data (2008 to 2013) presented in Table 2.8 and Table 2.9, the bias adjustment factors have been taken from previous LAQM reports completed by Fareham and Gosport Borough Councils.

PM Monitoring Adjustment

A Tapered Element Oscillating Microbalance (TEOM) is in operation at the Tichborne Way monitoring location to record PM_{10} concentration, TEOM monitors do not meet the equivalence criteria for PM_{10} monitoring therefore the data must be adjusted. The Tichborne Way PM_{10} data has been corrected using the Volatile Correction Model (VCM) methodology.

Short-term to Long-term Data Adjustment

For the 2014 diffusion tube data, annualisation was required at a total of twenty six sites; thirteen within Gosport and thirteen within Fareham. The annualisation process has been completed in line with Defra Technical Guidance LAQM.TG(09) Box 3.2 and details of the annualisation have been provided in Table B2.

QA/QC of Automatic Monitoring

Formal Quality Assurance/Quality Control (QA/QC) are currently provided by SupportingU, this ensures reliability and accuracy of the measurements. The monitoring sites are visited and checked every six months.

SupportingU subcontract Air Quality Data Management (AQDM) who carry out data collection and management for the council. Activities carried out by the data management team include:

- checking retrieved data once a day for anomalies and operational side failures;
- checking daily internal auto-calibration results twice weekly for anomalies such as drift or complete failure;
- reporting and monitoring all findings, liaising with the Council and SupportingU;

- Data Management also assists with failed or intermittent communications. Typically problems could be modem or logger related; and
- SupportingU and AQMD are able to change customers gas valves so that the correct value is displayed on the logger, ensuring that the correct value is displayed on the logger, ensuring that the internal calibration reports are correct, which is imperative for rescaling.

AQMD reports screened data as data validation. The bias correction is covered by the rescaling process as rescaling compensates for the drift of the analyser. Data is retrieved twice daily from the monitoring stations and all data is securely archived in the event of accidental data loss. The Data Management Team analyses the internal calibration results and the manual calibration checks to calculate the true analyser zero and response factor, and rescales the data accordingly. Rescaling is performed on a quarterly basis.

QA/QC of Diffusion Tube Monitoring

Gradko International Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. Gradko previously participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis and the Annual Field Inter-Comparison Exercise. In April 2014, a new scheme, AIR PT[7], was introduced. This is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the AIR PT scheme. Laboratory performance in AIR PT is also assessed, by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone

[7] http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-(April-2013--February-2015)-NO2-report.pdf

Road, central London. A laboratory is assessed and given a ‘z’ score. A score of 2 or less indicates satisfactory laboratory performance.

Gradko International Ltd’s performance for 2014 is covered by the last round of the WASP scheme, WASP R124 and the first four rounds of AIR PT, AR001-004. In each of these rounds, 100% of samples submitted by Gradko were deemed satisfactory.

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Appendix B: Diffusion Tube Monitoring Data

Table B1: Monthly NO_2 Concentrations – Gosport Borough Council Diffusion Tube Sites (2014)

Site ID	NO_2 Concentrations (µg/m^3)												Data Capture (no of months)	Average Concentration (µg/m^3)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
GP1	21.97	27.92	30.86	33.00	26.08	26.89	27.41	23.04	26.01	-	-	28.28	10	27.15
GP2	-	11.64	17.28	20.26	-	-	-	11.35	15.12	-	-	18.43	6	15.68
GP3	10.97	13.43	17.93	18.54	15.19	13.15	13.98	12.39	17.62	-	-	6.41	10	13.96
GP4	-	20.55	26.65	28.94	26.45	25.99	29.39	23.27	-	-	-	27.51	8	26.09
GP5	7.95	10.48	12.19	14.00	10.79	9.23	9.24	8.75	11.92	-	-	10.46	10	10.50
GP6	21.47	19.17	21.93	24.51	20.19	19.07	19.29	-	-	-	-	19.59	8	20.65
GP7	-	39.24	44.04	42.30	34.14	38.78	36.32	31.52	30.54	-	-	42.87	9	37.75
GP8	18.58	17.61	21.76	24.97	16.93	14.96	14.56	-	-	-	-	21.17	8	18.82
GP9	24.35	24.91	26.61	35.16	26.81	-	29.01	21.51	27.65	-	-	26.90	9	26.99
GP10	23.20	24.83	23.82	32.43	25.35	29.62	33.92	19.60	30.28	-	-	28.49	10	27.15
GP11	-	25.58	26.11	35.03	25.10	28.13	29.61	20.40	28.92	-	-	26.12	9	27.22
GP12	-	-	45.71	28.22	47.64	50.02	39.15		-	-	-	38.11	6	**41.48**
GP13	-	25.36	33.03	32.31	29.46	28.85	31.74	22.77	26.38	-	-	32.31	9	29.13
GP14	-	17.58	-	23.98	17.90	15.15	-	14.54	19.26	-	-	24.73	7	19.02
GP15	-	-	22.71	25.16	18.28	16.07	15.45	-	-	-	-	21.10	6	19.80
GP16	-	-	17.85	18.71	12.55	12.27	11.67	-	-	-	-		5	14.61
GP17	26.24	25.60	25.74	29.10	26.71	30.47	26.61	-	-	-	-	31.40	8	27.73
GP18	16.12	15.46	21.21	23.74	17.72	19.01	17.45	-	-	-	-	21.13	8	18.98
GP19	-	-	24.75	26.55	23.05	-	33.25	-	-	-	-	24.37	5	26.39
GP20	-	-	-	15.60	11.10	10.87	12.33	-	-	-	-	14.20	5	12.82
GP21	-	37.84	41.28	46.77	49.03	45.48	40.69	36.24	40.37	-	-	47.10	9	**42.76**
GP22	-	41.41	48.84	51.11	38.81	42.24	41.25	35.52	35.98	-	-	42.32	9	**41.94**
GP23	-	37.67	38.54	43.01	34.92	-	-	27.96	34.73	-	-	37.99	7	36.40

Exceedences of the AQS annual mean objective shown in **Bold**.

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Table B2: Short-Term to Long-Term Monitoring Data Adjustment – Gosport Borough Council (2014)

Site ID	Unadjusted Diffusion Tube Mean (µg/m^3)	Annualisation Factor Portsmouth	Annualisation Factor Southampton	Annualisation Factor Bournemouth	Average Annualisation Factor	Annualised & Bias Adjusted (0.91) Concentration (µg/m^3)
GP2	15.68	0.949	0.955	0.910	0.938	13.38
GP4	26.09	1.025	1.049	1.093	1.055	25.06
GP6	20.65	0.980	1.004	1.075	1.020	19.16
GP8	18.82	0.980	1.004	1.075	1.020	17.46
GP12	41.48	1.000	1.045	1.062	1.036	39.09
GP14	19.02	1.058	1.019	1.072	1.050	18.17
GP15	19.8	1.000	1.045	1.062	1.036	18.66
GP16	14.61	1.060	1.107	1.187	1.118	14.87
GP17	27.73	0.980	1.004	1.075	1.020	25.73
GP18	18.98	0.980	1.004	1.075	1.020	17.61
GP19	26.39	0.951	1.005	0.991	0.982	23.59
GP20	12.82	1.050	1.084	1.138	1.091	12.72
GP23	36.4	0.970	0.966	0.965	0.967	32.03

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Table B3: Monthly NO_2 Concentrations – Fareham Borough Council Diffusion Tube Sites (2014)

Site ID	NO_2 Concentrations (µg/m^3)												Data Capture (no of months)	Average Concentration (µg/m^3)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
3N	30.81	28.87	32.70	23.15	22.22	20.25	17.95	18.87	26.14	25.48	18.61	28.99	12	24.50
5N	29.29	28.58	32.30	26.00	29.22	19.81	15.55	18.71	26.21	26.28	24.87	31.02	12	25.65
7N	23.09	18.79	22.91	16.05	15.13	12.62	11.97	12.04	17.66	17.39	21.49	21.08	12	17.52
10N	24.73	27.91	28.31	21.56	18.42	16.17	15.60	16.56	19.97	19.63	25.41	24.38	12	21.55
10NA	28.40	25.66	27.71	24.39	17.91[b]	11.03	14.98	18.79	19.81	19.68	22.44	27.61	12	21.53
Av/Bf	29.32	25.75	32.81	23.41	20.56	23.89	12.89	29.26	36.47	33.50	26.35	31.63	12	27.15
BL1	44.89	43.08	45.73	43.14	39.49	31.13	23.38	21.99	36.38	38.62	41.51	40.05	12	37.45
G1A	44.20	37.01	39.85	37.04	33.86	-	26.88	28.33	33.48	26.15[a]	29.91	24.54[a]	11	32.84
G2A	38.07	34.83	36.55	31.20	27.95	25.84	22.45	26.77	29.56	33.60	29.63	38.45	12	31.24
G3	38.45	-	35.97	30.57	30.83	24.16	24.32	26.86	27.42	30.08	35.57	35.29	11	30.87
G4	33.00	36.55	32.64	30.22	27.82	21.87	23.81	23.80	27.24	33.27	32.12	32.51	12	29.57
G5	31.62	30.46	36.54	28.31	27.53	23.74	21.54	22.41	27.06	26.89	30.34	34.81	12	28.44
G6	40.28	32.95	34.28	35.92[b]	36.08	34.64	24.71	25.22	35.13	35.40	44.12	33.01	12	34.31
G7	49.17	40.71	46.93	48.48	42.73	38.28	37.69	34.01	38.91	46.77	44.40	40.05	12	**42.34**
G8Z	35.65	33.94	34.75	30.88	30.10	27.67	24.31	29.44	28.23	34.52	29.85	37.78	12	31.43
G9	33.42	28.76	28.31	-	-	24.93	19.84	20.62	25.08	30.25[a]	29.57	26.29	10	26.71
G10	45.96	39.56	41.53	40.09	22.74	36.36	27.09	34.55	38.85	42.49	36.01	39.59	12	37.07
G11	26.78[a]	24.24	30.41	27.65	-	20.63	22.35	24.40	26.54	31.14	22.88	35.20	11	26.57
G12	41.22	43.74	44.02	39.70	37.30	32.56	26.66	35.69	35.69	44.49	43.27	40.29	12	38.72
G14	39.00	32.98	46.53	37.61	34.38	33.09	26.59	20.70	38.57	29.74	40.16	27.48	12	33.90
HR1	39.79	38.32	42.17	38.88	36.79	29.37	35.05	35.12	37.46	40.45	41.88	42.96	12	38.19
HR2	32.30	34.29	40.68	30.93	30.81	24.70	23.56	25.32	31.44	34.56	35.79	33.57	12	31.50
HR3A	29.62	28.23	31.64	26.68	30.42	22.13	19.74	19.69	30.18	24.91	37.79	30.92	12	27.66
HR4	38.13	37.03	39.00	31.22	30.68	24.08	23.59	19.08	29.82	27.63	36.20	35.51	12	31.00
LH1	29.22	27.48	32.54	26.71	24.76	22.69	20.78	19.97	27.58	20.11	26.60	31.02	12	25.79
LH3	31.45	-	33.98	31.20	28.99	25.76	23.55	22.10	33.16	27.12	26.76	30.80	11	28.62
P1B	30.62	27.82	28.91	23.68	22.88[b]	19.22	16.29	16.23	-	25.63	29.24	26.73	11	24.30
P2	24.27	24.42	27.31	22.04	18.67	15.55	15.62	16.31	20.59	22.08	27.75	27.88	12	21.87
P4	36.13	29.32	35.31	30.86	22.55	22.92	20.83	17.16	26.48	29.12	29.09	31.97	12	27.65
P5	-	19.59	31.29	23.99	24.20	22.86	20.65	19.56	28.47	27.37	33.06	-	10	25.10
P6	27.06	25.59	28.75	24.22	21.36	18.85	16.65	16.61	21.41	24.56	31.28	31.08	12	23.95
P7A	23.99	20.19	23.71	20.93	16.51	14.70	15.25	0.35[c]	20.26	18.15	22.56	25.04	12	20.12

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PS1	36.49	31.28	43.35	42.86	34.29	27.76	27.59	27.10	36.00	34.84	40.67	37.23	12	34.96
PS1A	39.88	-	42.33	39.98	40.11	30.16	29.55	27.45	33.09	34.73	39.86	39.41	11	36.05
PS1B	37.26	33.03	41.45	37.41	40.17	28.76	28.44	28.65	33.57	35.99	45.23	34.41	12	35.36
PS2	40.31	38.16	46.24	40.94	35.47	32.45	30.49	32.09	37.46	38.61	40.53	42.05	12	37.90
PS3	40.14	42.35	47.44	40.86	38.29[a]	-	-	41.17	39.39	41.90	42.83	47.53	10	**42.19**
PS4	43.83	39.01	49.73	46.10	47.80	32.99	33.79	32.87	41.81	45.05	54.03	40.04	12	**42.25**
PS5	49.42	46.35	54.22	45.30	44.70	36.38	30.16	32.40	46.02	42.13	0.16[c]	83.93	12	**46.46 (42.71[d])**
PS6	56.07	40.88	54.30	48.01	44.55	35.07	33.85	30.41	42.40	40.80	46.80	44.79	12	**43.16**
S2	26.42	20.45	30.87	25.85	24.96	21.58	20.52	14.97	29.37	21.67	33.24	24.41	12	24.53
T1	28.36	21.38	30.84	26.14	22.19	19.96	1.06[c]	-	29.09	23.22	28.20	25.12	11	25.45
E1	38.74	39.16	43.94	36.73	34.34	31.39	33.07	32.25	34.08	39.78	35.46	37.35	12	36.36
E2	41.86	41.87	43.14	36.01	36.08	18.57	33.30	30.45	35.12	44.88	35.56	43.71	12	36.71
E3	38.76	39.68	36.69	35.20	36.82	28.69	31.72	32.32	33.25	42.82	34.05	41.85	12	35.99
DC1	30.03	29.66	34.62	29.18	24.74	20.52	20.72	22.89	27.77	26.35	30.91	34.05	12	27.62
RM1	27.97	25.38	33.43	25.19	23.22	22.75	26.28	24.01	29.48	21.50	33.20	31.87	12	27.02
GR/RL	30.16	25.89	34.10	27.27	25.08	23.46	20.15	17.01	27.68	24.44	31.92	27.90	12	26.26
NL11	25.31	18.14	28.93	23.42	19.77	18.67	16.61	13.09	25.50	17.06	27.50	20.73	12	21.23
AQ1	35.58	31.35	35.08	31.22	25.62	-	-	-	-	-	-	-	5	31.77
AQ2	37.55	40.08	37.25	28.33	31.22	-	-	-	-	-	-	-	5	34.89
AQ3	40.83	35.74	39.04	38.58	36.52	-	-	-	-	-	-	-	5	38.14
AQ4	38.68	33.89	42.69	31.25	35.38	-	-	-	-	-	-	-	5	36.38
AQ5	36.14	35.85	35.67	27.72	-	-	-	-	-	-	-	-	4	33.85
AQ6	34.04	29.00	31.91	27.55	23.55	-	-	-	-	-	-	-	5	29.21
AQ7	38.61	36.93	31.21	27.65	26.34	-	-	-	-	-	-	-	5	32.15
AQ8	46.48	-	39.25	37.88	36.73	-	-	-	-	-	-	-	4	**40.09**
AQ8A	-	-	-	-	-	-	-	24.69	-	31.28	29.75	29.03	4	28.69
AQ9	32.07	27.84	30.43	17.90	22.07	-	-	-	-	-	-	-	5	26.06
AQ10	28.12	18.96[a]	13.97	-	14.45	-	-	-	-	-	-	-	4	18.88
AQ11	35.85	32.77	31.22	27.48	29.73	-	-	-	-	-	-	-	5	31.41
AQ12	35.77	40.74	31.70	29.57[b]	25.20	-	-	-	-	-	-	-	5	32.60

Exceedences of the AQS annual mean objective shown in **Bold**.
[a] Diffusion tube found on the ground – treat results with caution.
[b] Insect/spider found inside the diffusion tube – treat results with caution.
[c] Results have not been used within average calculations due to extremely low inconsistent results.
[d] Average in brackets does not include extremely high inconsistent results.

Fareham and Gosport Environmental Health Partnership

Table B2: Short-Term to Long-Term Monitoring Data Adjustment – Fareham Borough Council (2014)

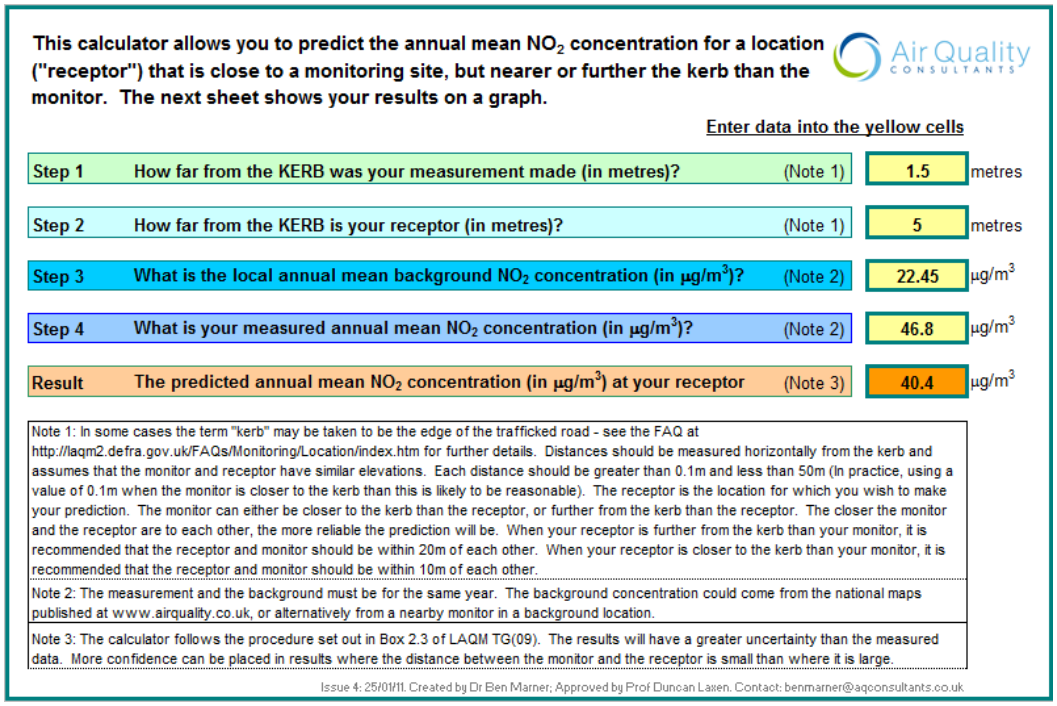
Site ID	Unadjusted Diffusion Tube Mean (µg/m3)	Annualisation Factor Southampton	Annualisation Factor Bournemouth	Annualisation Factor Brighton	Average Annualisation Factor	Annualised & Bias Adjusted (1.09) Concentration (µg/m3)
AQ1	31.77	0.928	1.055	0.940	0.974	33.74
AQ2	34.89	0.928	1.055	0.940	0.974	37.05
AQ3	38.14	0.928	1.055	0.940	0.974	**40.51**
AQ4	36.38	0.928	1.055	0.940	0.974	38.64
AQ5	33.85	0.903	0.993	0.912	0.936	34.53
AQ6	29.21	0.928	1.055	0.940	0.974	31.03
AQ7	32.15	0.928	1.055	0.940	0.974	34.15
AQ8	40.09	0.931	1.004	0.886	0.940	**41.08**
AQ8A	28.69	0.947	0.808	0.915	0.890	27.84
AQ9	26.06	0.928	1.055	0.940	0.974	27.68
AQ10	18.88	0.917	1.061	0.936	0.971	19.98
AQ11	31.41	0.928	1.055	0.940	0.974	33.36
AQ12	32.60	0.928	1.055	0.940	0.974	34.62

Exceedences of the AQS annual mean objective shown in **Bold**.

Appendix C: Distance Correction Calculations

NO2 fall-off with distance calculator published by Defra on the LAQM Support website. Background NO_2 has been obtained from UK background maps 2014.

Portland Street Automatic Monitor, Fareham Borough Council



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

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Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	5	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	22.45	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	46.8	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	40.4	µg/m^3

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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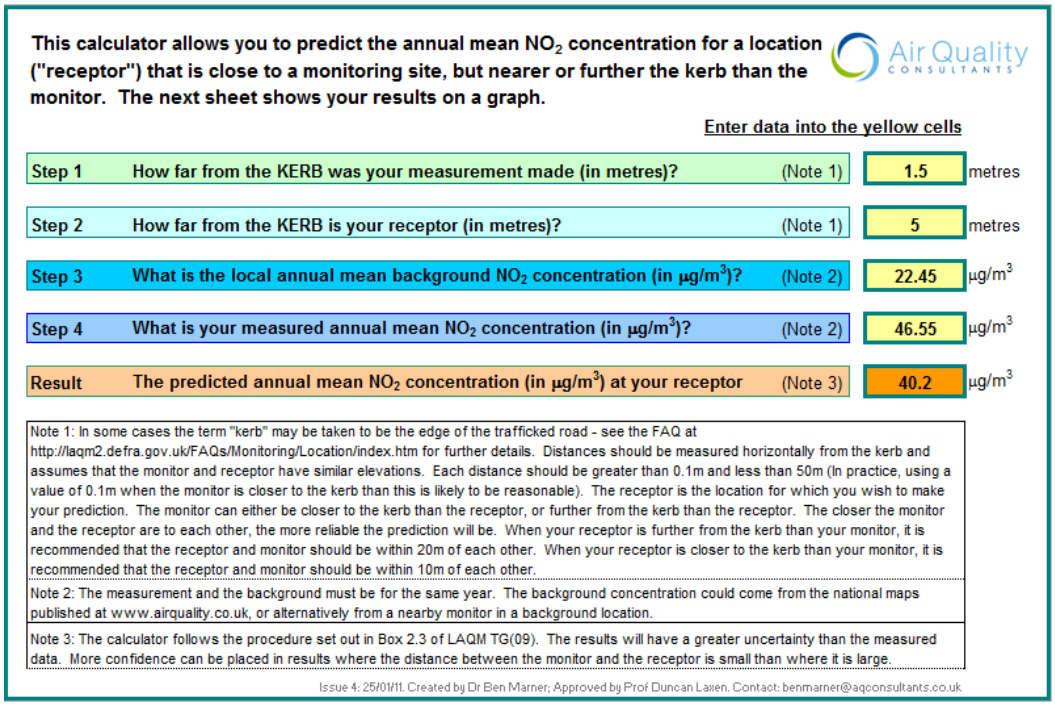
PS4/5/6 – Co-located with Portland St Monitor, Fareham Borough Council



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	5	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	22.45	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	46.55	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	40.2	µg/m^3

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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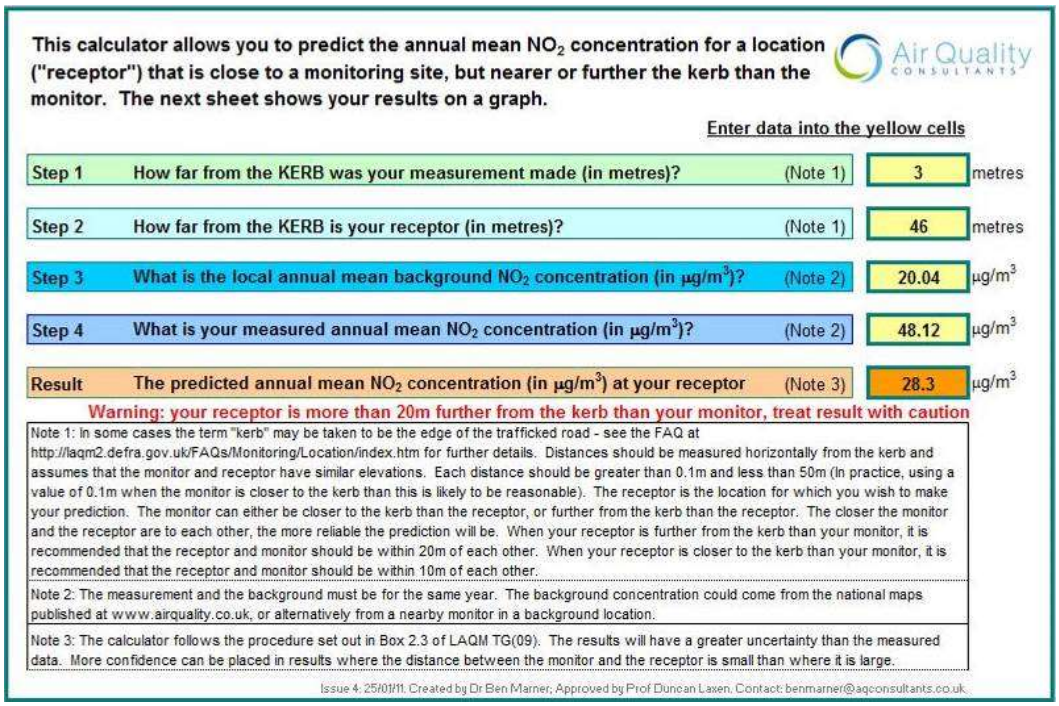
GP12 – Fareham Way/Lederle Lane, Gosport Borough Council



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	46	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	20.04	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	48.12	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	28.3	$\mu g/m^3$

Warning: your receptor is more than 20m further from the kerb than your monitor, treat result with caution

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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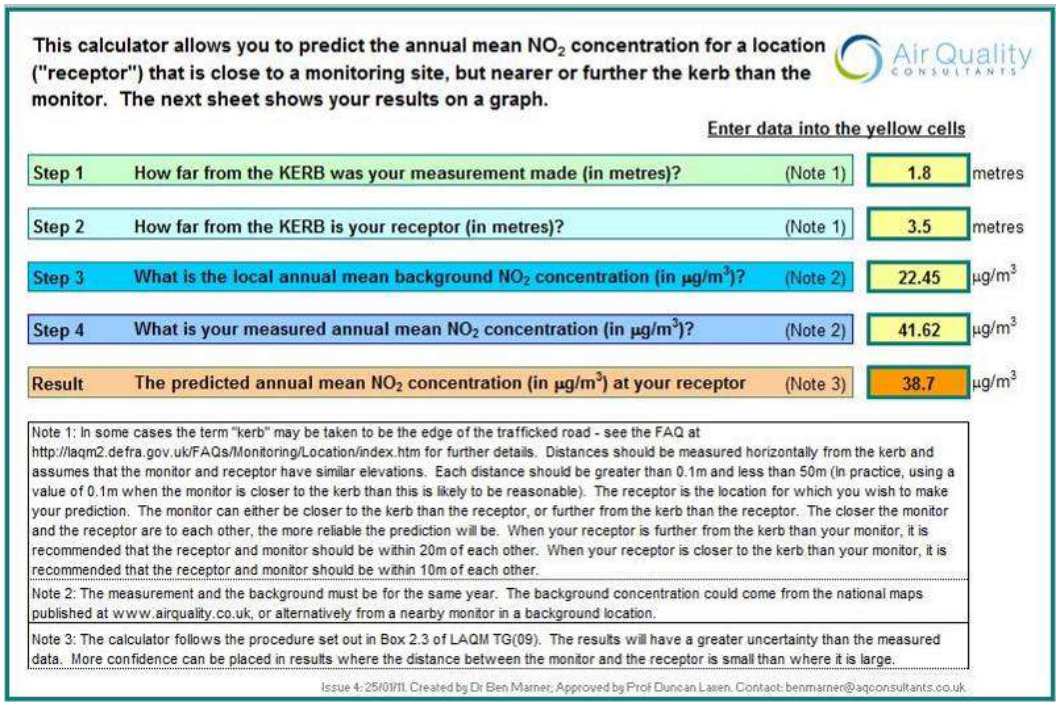
HR1 – 8 Hartlands Road, Fareham Borough Council



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.8	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	3.5	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	22.45	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	41.62	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	38.7	$\mu g/m^3$

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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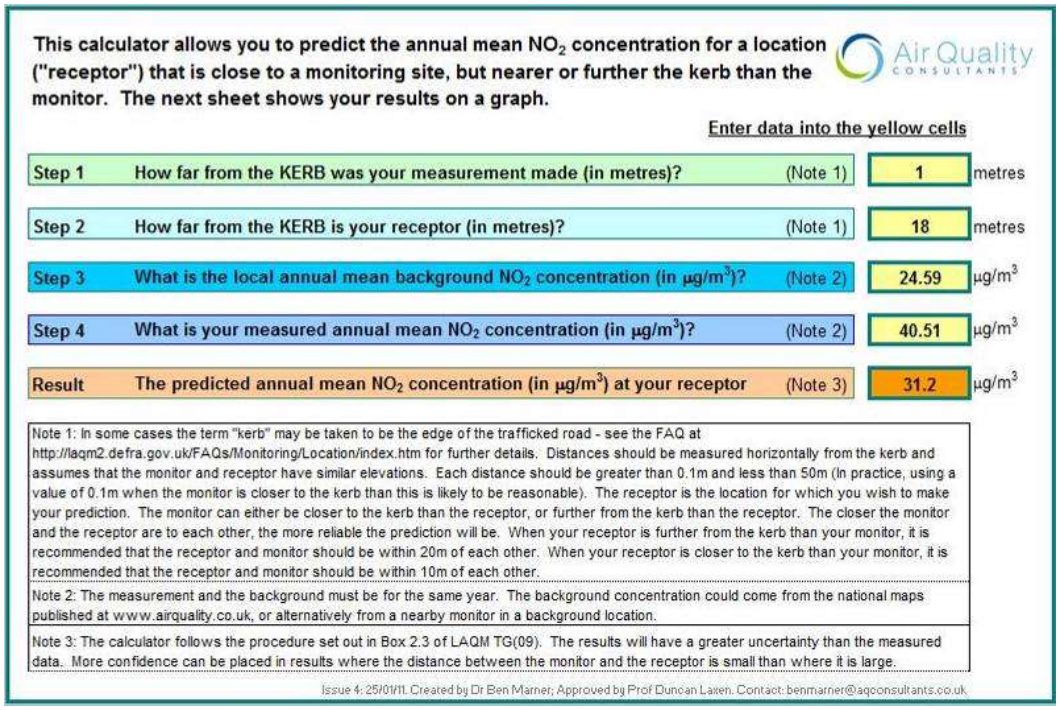
AQ3 – Botley Road/Ashley Close, Fareham Borough Council



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

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Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	18	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	24.59	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	40.51	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	31.2	$\mu g/m^3$

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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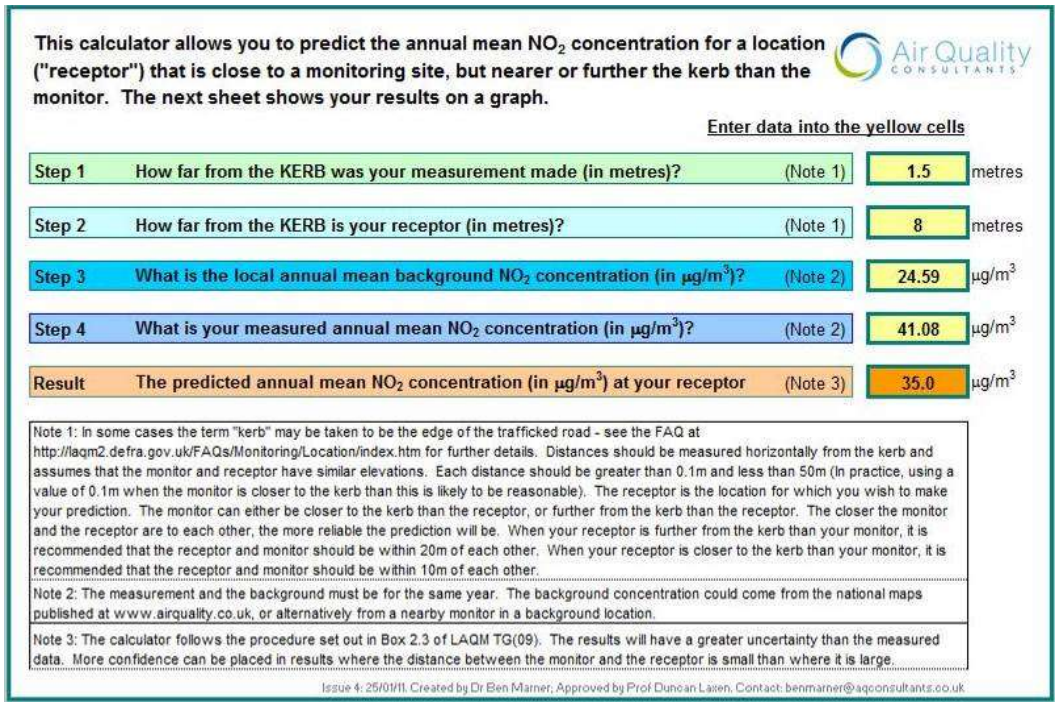
AQ8 – Rosemary House/Botley Road, Fareham Borough Council



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

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Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	8	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	24.59	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	41.08	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	35.0	$\mu g/m^3$

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

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