







***South Kesteven District Council  
Updating And Screening  
Assessment 2015***

*Bureau Veritas Air Quality  
November 2015*

***Move Forward with Confidence***



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# 2015 Updating and Screening Assessment for South Kesteven District Council

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

November 2015

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## 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.

Updated monitoring showed that there were three exceedences of the AQS Nitrogen Dioxide (NO<sub>2</sub>) annual mean objective at passive diffusion sites within the District. These locations are within the designated Air Quality Management Area (AQMA) that is currently in force within Grantham.

A number of planning applications have been received that through their operation or processes have the potential to impact local air quality. Three applications for the installation of biomass boilers have been assessed using a combination of the Biomass Calculator tool, the Biomass Unit Converter and Screening Tool, and the ADMS-Screen model. All of the installations were shown to produce emissions lower than the target emissions rates or pollutant concentrations lower than the AQS objectives, therefore Detailed Assessments for these installations are not required.

The proposed actions from the 2015 Updating and Screening Assessment are:

- Continue non-automatic monitoring of NO<sub>2</sub> using diffusion tubes to identify future changes in pollutant concentrations;
- The Grantham AQMA is to remain due to a number of exceedences of the AQS NO<sub>2</sub> annual mean objective; and
- Review the need for a possible Detailed Assessment in the Rosemary Crescent and Welwyn Close area of Grantham, once assessment of the SQLR scheme is complete; and

- Proceed to an Annual Progress Report in 2016.

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# **1 Introduction**

## **1.1 Description of Local Authority Area**

The district of South Kesteven is very diverse, comprising the principal towns of Grantham, Stamford and Bourne that are surrounded by small villages and hamlets. The main source of air pollution within the district is road traffic emissions from major roads, notably the A1, A52, A15 and A607.

In August 2013, an Air Quality Management Area (AQMA) was declared in Grantham that encompassed the AQMA's previously declared at Wharf Road and Manthorpe Road, and extended the existing boundaries to include High Street and London Road.

## **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 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  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  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 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM <sub>10</sub> ) (gravimetric)	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

## 1.4 Summary of Previous Review and Assessments

South Kesteven District Council undertook the First Round of Review and Assessment between 1998 and 2002. The First Round concluded that road traffic emissions (notably NO<sub>2</sub> and PM<sub>10</sub>) from vehicles were the main issue with respect to local air quality and four AQMAs for NO<sub>2</sub> were declared in Grantham. Three of the AQMAs were located to the west of the town centre close to the A1 and one (Wharf Road AQMA) was in the town centre (maps of these AQMAs can be viewed in the previous reports).

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The Second Round commenced in 2003 with the Updating and Screening Assessment (USA). The USA concluded that a Detailed Assessment of air quality was not required. The three AQMAs close to the A1 were revoked leaving only the Wharf Road AQMA (declared for NO<sub>2</sub>) still open. The Annual Progress Reports 2004 and 2005 indicated that roadside monitoring undertaken at Manthorpe Road (Jet) showed a risk of exceedence of the annual mean NO<sub>2</sub> objective at relevant receptors and it was recommended that a Detailed Assessment be undertaken. The Detailed Assessment (2006) predicted that the annual mean objective was being met at relevant receptor locations at that time.

The first phase of the Third Round of Review and Assessment, the USA, was completed in June 2006 and this provided a further update with respect to air quality issues within South Kesteven. The USA concluded that all objectives were expected to be met and no Detailed Assessment was required. The 2007 and 2008 Annual Progress Reports considered the latest available monitoring data and concluded that a Detailed Assessment was not required.

The Fourth Round of Review and Assessment, which started with the USA 2009, concluded that the air quality objectives for benzene, 1,3-butadiene, carbon monoxide, lead, particles and sulphur dioxide would be met and that there was no requirement to undertake a Detailed Assessment for these pollutants. However, review of new monitoring showed that exceedences continued to occur in the Wharf Road AQMA and also in the vicinity of the Jet petrol station on Manthorpe Road where a Detailed Assessment had previously been undertaken. New exceedences were monitored at High Street, London Road and South Parade in Grantham; although there was no relevant exposure at South Parade. It was therefore proposed that South Kesteven District Council progress to a Detailed Assessment (for annual mean NO<sub>2</sub>) at Manthorpe Road around the Jet petrol station whilst also undertaking additional receptor-based monitoring of nitrogen dioxide at relevant receptor locations at High Street and London Road in Grantham. It was also advised that South Kesteven District Council install triplicate diffusion tubes at the Wharf Road continuous nitrogen dioxide analyser, once it was reinstated, in order to gain a local bias correction factor for diffusion tubes. Monitoring at the Wharf Road continuous monitoring station, with triplicate co-located tubes, recommenced in September 2009.

The Detailed Assessment for Manthorpe Road was completed in 2010, and confirmed the need to declare an AQMA for both the long term and short-term NO<sub>2</sub> objectives the declared area is shown below.

The 2010 Progress Report recommended Detailed Assessments be carried out in Grantham on the High Street and London Road areas and in Great Northern Court in Grantham. The 2011 Progress Report confirmed the need for a Detailed Assessment to be carried out at the three locations identified in 2010.

The 2011 Detailed/Further Assessment looked at a number of locations across the town centre to determine if AQMAs were required. The findings were the following;

- The Brook Street – Manthorpe Road AQMA was still considered necessary due to monitored and modelled exceedences of the NO<sub>2</sub> annual mean Air Quality Objective. It was also recommended that the AQMA be extended further along Manthorpe Road.
- The area around Great Northern Court, west of the current Wharf Road AQMA was found to be in exceedence of the NO<sub>2</sub> annual mean Air Quality Objective. It was recommended the Wharf Road AQMA be extended to include this area.
- The High Street was found to have areas of modelled and monitored exceedence of the NO<sub>2</sub> annual mean Air Quality Objective. It was recommended to consider declaring an AQMA for this area of the town centre.
- London Road, east of the Wharf Road AQMA was found to be in exceedence of the NO<sub>2</sub> annual mean Air Quality Objective. It was recommended the Wharf Road AQMA be extended to include this area. London Road (A52) has also been found to be in exceedence of the NO<sub>2</sub> annual mean Air Quality Objective at the junction with Bridge End Road close to the bridge over the River Witham. As such, it was recommended this area be considered for declaration as an AQMA.
- Barrowby Road and the roads around Premier Court, North of the High Street were modelled and some areas were found to be in exceedence of the NO<sub>2</sub> annual mean Air Quality Objective. It was recommended this area be considered for declaration as an AQMA.

- As a number of additional areas across the town centre have been found to be in exceedance of the NO<sub>2</sub> annual mean Air Quality Objective it was recommended that the council consider joining the separate AQMAs into one AQMA that covers the whole area affected as this would improve and simplify management of Action Plan schemes and reduce duplication of reporting.

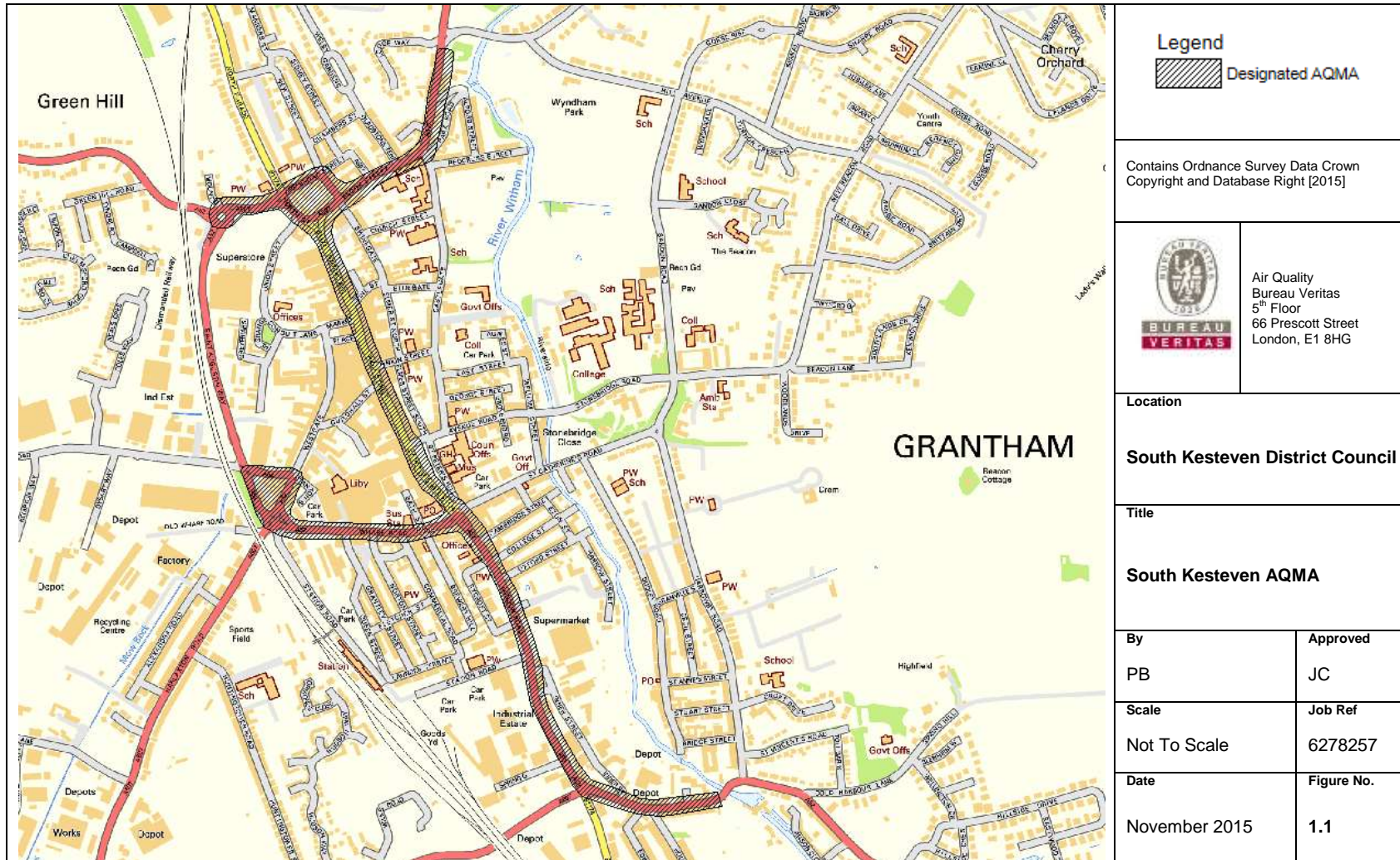
Following the 2011 Detailed/Further Assessment, South Kesteven declared an AQMA in 2011 for the area incorporating Brooke Street and Manthorpe Road, Grantham (map of this AQMA can be viewed in the previous reports).

Monitoring for NO<sub>2</sub> in 2011 indicated that the air quality objectives were being exceeded at a number of locations across Grantham; thus the 2012 USA highlighted the continued need for a new town centre AQMA to be declared in Grantham. Monitoring in Stamford indicated there may be an exceedance of the annual mean objective for NO<sub>2</sub> on St John's Street (narrow street canyon) in the town centre. It was recommended that the Council carried out a Detailed Assessment at this area.

In August 2013 one large AQMA in Grantham was declared as the Council extended the existing Wharf Road and Manthorpe Road AQMAs to include High Street and London Road, Grantham (Figure 1.1).

The 2014 Progress Report contained monitoring data for 2012 and 2013 due to a Progress Report not being completed in 2013. From the completion of the Progress Report it was recommended to continue NO<sub>2</sub> diffusion tube monitoring in the District to identify future changes in pollutant concentrations and to continue to gather emission and stack information for the identified biomass installations to determine their potential impact upon local air quality.

Figure 1.1: South Kesteven AQMA



## **2 New Monitoring Data**

### **2.1 Summary of Monitoring Undertaken**

#### **2.1.1 Automatic Monitoring Sites**

South Kesteven District Council did not carry out automatic monitoring for any pollutants in 2014. The Wharf Road automatic monitor that measured NO<sub>2</sub> was decommissioned at the end of December 2013.

#### **2.1.2 Non-Automatic Monitoring Sites**

South Kesteven District Council undertook monitoring using passive NO<sub>2</sub> diffusion tubes at 37 locations in 2014, but with a decrease in the number of diffusion tubes maintained. Due to the automatic monitor at Wharf Road being decommissioned there is no longer a co-located study within the District.

The number of triplicate locations has been reduced from 13 locations in 2013 to 4 locations in 2014, and the number of duplicate locations has increased from 6 locations in 2013 to 15 locations in 2014.

In July 2014, the triplicate tubes SK41/SK42/SK43 were removed from their location where the decommissioned Wharf Road automatic monitor was situated.

The locations of the NO<sub>2</sub> diffusion tubes are shown in Figure 2.1 and Figure 2.2, and details of the monitoring network are given in Table 2.1.



Figure 2.1: Map of Non-Automatic Monitoring Sites: Stamford

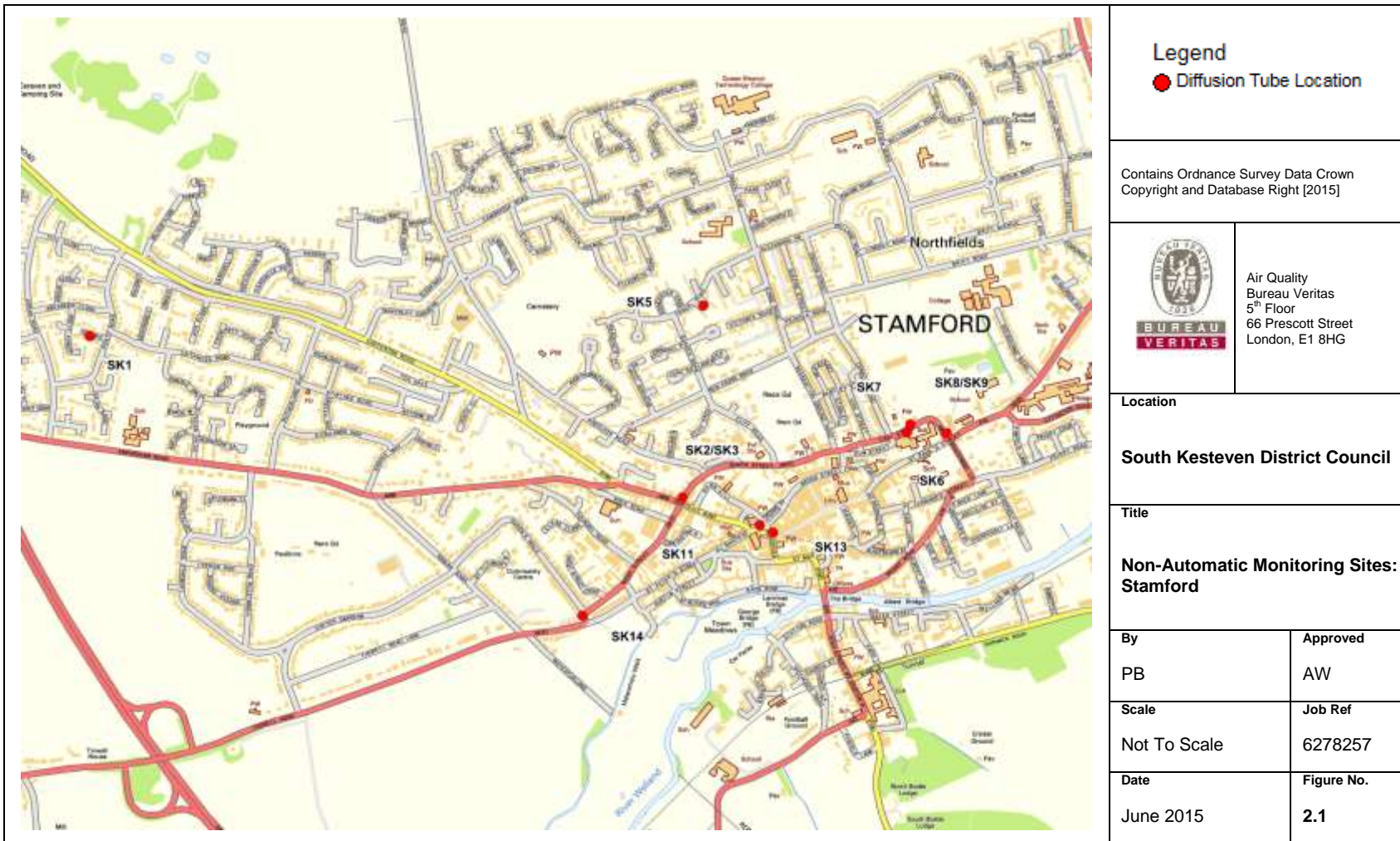
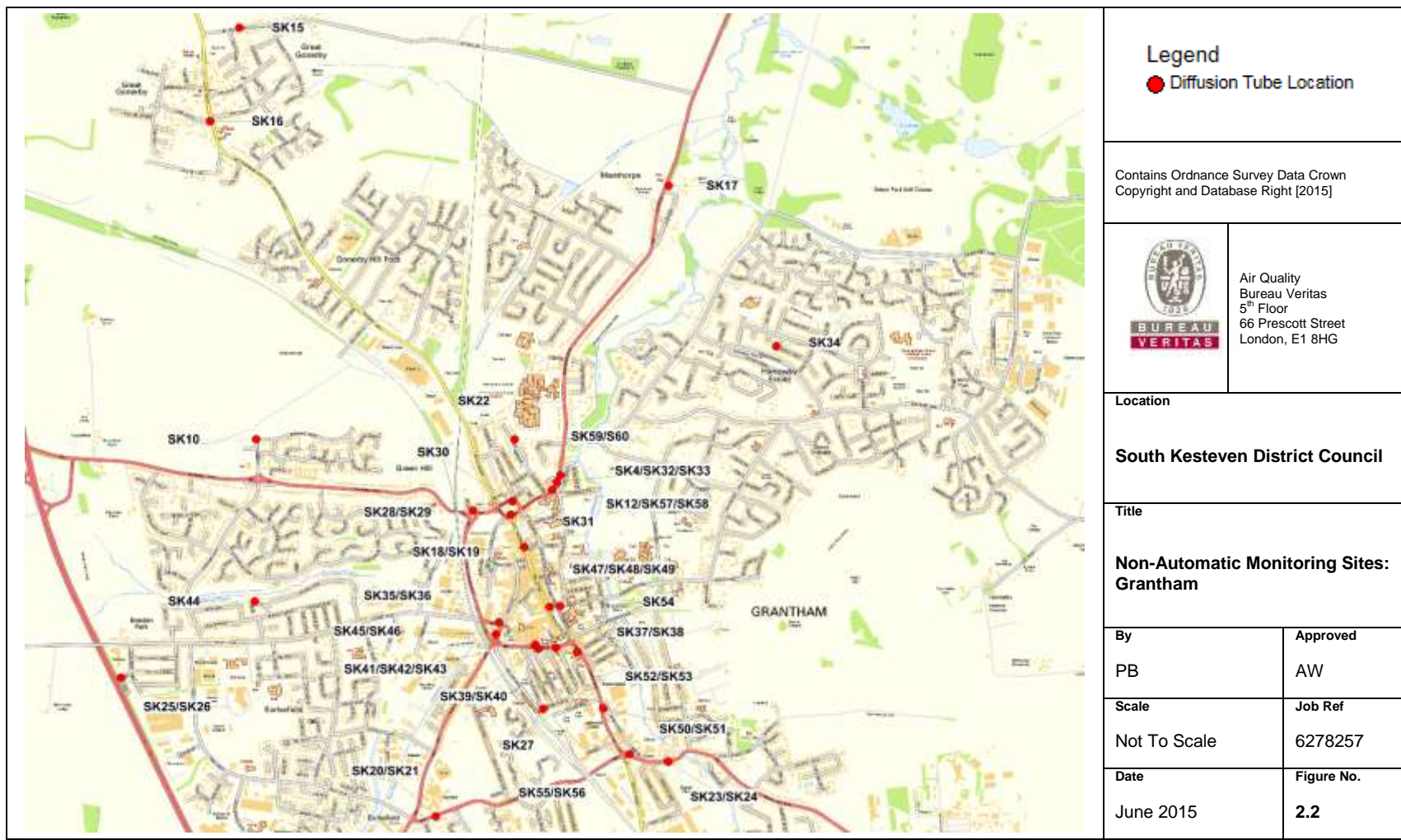


Figure 2.2: Map of Non-Automatic Monitoring Sites: Grantham



**Table 2.1: Details of Non-Automatic Monitoring Sites**

Site ID	Site Name	Site Type	OS Grid Reference (X,Y)		Is monitoring collocated with a Continuous Analyser (Y/N)	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
SK1	Troon	Roadside	501016	307665	N	N	Y (5.9)	2.3	N
SK2/SK3	Scotgate	Roadside	502659	307218	Duplicate	N	N	1.6	Y
SK4/SK32/SK33	Jet Garage	Roadside	491496	336354	Triplicate	Y	Y (0)	2.3	N
SK5	Essex Road	Roadside	502717	307750	N	N	Y (14.3)	23.4	N
SK6	Stamford School	Roadside	503281	307398	N	N	N	2.5	N
SK7	Opp Stam' Sch	Roadside	503291	307420	N	N	N	5.7	Y
SK8/SK9	East St	Roadside	503391	307396	Duplicate	N	N	3.2	Y
SK10	Balmoral Dr	Urban Background	489956	336574	N	N	Y (32.1)	0.8	Y
SK11	All Saints Rd	Roadside	502873	307141	N	N	Y (19)	2.5	Y
SK12/SK57/SK58	King's Sch	Roadside	491472	336315	Triplicate	Y	Y (2.2)	2.7	Y
SK13	London Inn	Roadside	502910	307120	N	N	Y (0)	2.3	Y
SK14	Avondale	Roadside	502382	306890	N	N	Y (4.7)	1.3	N
SK15	Gt Goverby	Roadside	489870	338683	N	N	Y (10.8)	5.0	N
SK16	Pond Street	Near Roadside	489720	338204	N	N	Y (16)	9.5	N
SK17	Manthorpe	Roadside	492069	337874	N	N	Y (49.6)	7.6	Y
SK18/SK19	Black Dog	Roadside	491330	336022	Duplicate	Y	Y (5)	1.0	Y
SK20/SK21	Springfield Road	Roadside	490877	334642	Duplicate	N	Y (24.5)	2.1	Y
SK22	Belton Lane	Roadside	491280	336573	N	N	Y (9.9)	7.0	Y
SK23/SK24	The White Lion	Roadside	492067	334922	Duplicate	Y	Y (5)	1.0	Y
SK25/SK26	Meres Road	Roadside	489263	335353	Duplicate	N	Y (26)	12.1	Y
SK27	Laundry Terr	Roadside	491427	335193	N	N	Y (4.0)	1.4	Y
SK28/SK29	Opp Asda	Roadside	491067	336209	Duplicate	Y	Y (2.6)	5.4	Y
SK30	Prem Court	Roadside	491270	336256	N	Y	Y (0)	7.6	Y

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Site ID	Site Name	Site Type	OS Grid Reference (X,Y)		Is monitoring collocated with a Continuous Analyser (Y/N)	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
SK31	Prem Court	Roadside	491260	336188	N	Y	Y (0.5)	6.0	Y
SK34	Hobart Road	Urban Background	492620	337051	N	N	Y (0)	17.8	Y
SK35/SK36	Blue Bull	Roadside	491200	335636	Duplicate	N	Y (2)	0.5	Y
SK37/SK38	Bus Stn	Roadside	491492	335505	Duplicate	Y	Y (1.5)	1.4	Y
SK39/SK40	Wharf Rd	Roadside	491402	335501	Duplicate	Y	Y (0.8)	0.9	Y
SK41/SK42/SK43	AQM	Roadside	491387	335523	Triplicate	Y	Y (0)	5	Y
SK44	St Helens	Urban Background	489949	335744	N	N	Y (15.1)	1.4	Y
SK45/SK46	Gt Northern Court	Roadside	491184	335575	Duplicate	N	Y (0)	3.6	Y
SK47/SK48/SK49	High St	Roadside	491460	335715	Triplicate	Y	Y (1.2)	0.8	N
SK50/SK51	Taste of China	Roadside	491734	335196	Duplicate	Y	Y (2)	0.5	Y
SK52/SK53	London Rd	Roadside	491602	335485	Duplicate	Y	Y (2.4)	3.9	Y
SK54	Old Job Centre	Roadside	491512	335719	N	N	Y (51.2)	1.7	Y
SK55/SK56	South Parade	Roadside	491869	334960	Duplicate	Y	N	3.5	Y
SK59/S60	Opp Jet Garage	Roadside	491515	336389	Duplicate	Y	Y (0)	1.7	Y

## 2.2 Comparison of Monitoring Results with Air Quality Objectives

### 2.2.1 Nitrogen Dioxide

There are two AQS objectives for NO<sub>2</sub>, namely:

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

There is no continuous monitoring of NO<sub>2</sub> undertaken within South Kesteven, therefore compliance with the hourly mean objective cannot be accurately assessed.

#### Diffusion Tube Monitoring Data

Diffusion tube data obtained for the year 2014 was supplied and analysed by Environmental Scientifics Group (ESG), the tubes were prepared using the 50% triethanolamine (TEA) in acetone preparation method. All results have been bias adjusted and a number of sites have been annualised due to low data capture.

There were 7 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 (Nottingham Centre, Leicester University and Market Harborough) located within 50 miles of South Kesteven were used. These sites form part of the national Automatic Urban and Rural Network (AURN) and are categorised as background sites; as such they are not subjected to localised effects that may occur at roadside monitoring sites.

It is necessary to apply a bias adjustment factor to NO<sub>2</sub> diffusion tube results. This is an estimate of the difference between diffusion tube concentrations 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<sub>x</sub>/NO<sub>2</sub> 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 no co-located diffusion tubes in South Kesteven due to the decommissioning of the Wharf Road Automatic Monitor, therefore the use of the national database is required. In 2014 this factor was based on one co-location study only, whereas previous years' factors have been based on several studies; as such the 2014 results should be treated with more caution than previous years.

Results of annual mean NO<sub>2</sub> concentrations measured with diffusion tubes in 2014 after annualisation and bias adjusted are reported in Table 2.2. Monthly results of NO<sub>2</sub> concentrations without bias adjustment or annualisation completed are also provided in Appendix B: Diffusion Tube Monitoring Data.

The results of NO<sub>2</sub> diffusion tube data (2008 – 2014) are presented in Table 2.3 and a chart displaying the trends in annual mean NO<sub>2</sub> concentration over the past six years is presented in Figure 2.3.

The results of the diffusion tube data for 2014 show that exceedences of the NO<sub>2</sub> annual mean objective were recorded at three sites, these were as follows:

- SK4/SK32/SK33 – Jet Garage, triplicate site (in AQMA);
- SK37/SK38 – Bus Station, duplicate site (in AQMA); and
- SK59/SK60 – Opposite Jet Garage, duplicate site (In AQMA).

These three sites above are all located within the current AQMA and have shown exceedences in previous years of Review and Assessment, including 2013. Concentrations at SK39/SK40 (Wharf Road) have decreased from 2013 to 2014 and the site did not exceed the NO<sub>2</sub> annual mean objective in 2014; this site has previously exceeded the NO<sub>2</sub> annual mean objective from 2008 to 2013.

There are no sites where the annual mean is greater than 60 µg/m<sup>3</sup>; therefore in accordance with Defra Technical Guidance TG(09) there are no sites likely to be at risk of exceeding the 1-hour mean AQS Objective.

Table 2.2: Results of Nitrogen Dioxide Diffusion Tubes in 2014

Site ID	Location	Site Type	Within AQMA?	Duplicate, Triplicate or Collocated Tube	Data Capture 2014 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	2014 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = 0.76
SK1	Troon	Roadside	N	-	11	N	N	17.0
SK2/SK3	Scotgate	Roadside	N	Duplicate	8	Y	N	31.4
SK4/SK32/SK33	Jet Garage	Roadside	Y	Triplicate	11	N	N	<b>46.5</b>
SK5	Essex Road	Roadside	N	-	11	N	N	15.0
SK6	Stamford School	Roadside	N	-	10	N	N	38.5
SK7	Opp Stam' Sch	Roadside	N	-	10	N	N	38.3
SK8/SK9	East St	Roadside	N	Duplicate	11	N	N	34.9
SK10	Balmoral Dr	Urban Background	N	-	11	N	N	16.4
SK11	All Saints Rd	Roadside	N	-	10	N	N	28.5
SK12/SK57/SK58	King's Sch	Roadside	Y	Triplicate	11/11/11	N	N	34.5
SK13	London Inn	Roadside	N	-	10	N	N	26.5
SK14	Avondale	Roadside	N	-	11	N	N	19.1
SK15	Gt Goverby	Roadside	N	-	11	N	N	21.5
SK16	Pond Street	Near Roadside	N	-	11	N	N	17.4
SK17	Manthorpe	Roadside	N	-	11	N	N	20.7
SK18/SK19	Black Dog	Roadside	Y	Duplicate	11	N	N	36.6
SK20/SK21	Springfield Road	Roadside	N	Duplicate	7/10	Y*	N	25.0
SK22	Belton Lane	Roadside	N	-	11	N	N	24.3

South Kesteven District Council

Site ID	Location	Site Type	Within AQMA?	Duplicate, Triplicate or Collocated Tube	Data Capture 2014 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	2014 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = 0.76
SK23/SK24	The White Lion	Roadside	Y	Duplicate	11	N	N	35.3
SK25/SK26	Meres Road	Roadside	N	Duplicate	10	N	N	25.8
SK27	Launder Terr	Roadside	N	-	11	N	N	20.7
SK28/SK29	Opp Asda	Roadside	Y	Duplicate	11	N	N	30.6
SK30	Prem Court	Roadside	Y	-	11	N	N	27.0
SK31	Prem Court	Roadside	Y	-	11	N	N	24.9
SK34	Hobart Road	Urban Background	N	-	11	N	N	13.5
SK35/SK36	Blue Bull	Roadside	N	Duplicate	10/11	N	N	34.6
SK37/SK38	Bus Stn	Roadside	Y	Duplicate	11	N	N	<b>45.5</b>
SK39/SK40	Wharf Rd	Roadside	Y	Duplicate	11	N	N	37.9
SK41/SK42/SK43	AQM	Roadside	Y	Triplicate	3	Y	N	21.8
SK44	St Helens	Urban Background	N	-	10	N	N	15.3
SK45/SK46	Gt Northern Court	Roadside	N	Duplicate	11	N	N	32.1
SK47/SK48/SK49	High St	Roadside	Y	Triplicate	11	N	N	37.3
SK50/SK51	Taste of China	Roadside	Y	Duplicate	10/11	N	N	31.3
SK52/SK53	London Rd	Roadside	Y	Duplicate	9	N	N	38.2
SK54	Old Job Centre	Roadside	N	-	8	Y	N	26.6
SK55/SK56	South Parade	Roadside	Y	Duplicate	9	N	N	39.6
SK59/S60	Opp Jet Garage	Roadside	Y	Duplicate	10	Y	N	<b>45.1</b>

Notes – Exceedences of the NO<sub>2</sub> annual mean AQS objective of 40  $\mu\text{g}/\text{m}^3$  in **bold**. \* - Diffusion tube with data capture of less than 75% has been annualised.



Table 2.3: Results of Nitrogen Dioxide Diffusion Tubes (2008 to 2014)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$						
			2008 (Bias Adjustment Factor = 0.93)	2009 (Bias Adjustment Factor = 0.99)	2010 (Bias Adjustment Factor = 0.83)	2011 (Bias Adjustment Factor = 0.84)	2012 (Bias Adjustment Factor = 0.84)	2013 (Bias Adjustment Factor = 0.73)	2014 (Bias Adjustment Factor = 0.76)
SK1	Roadside	N	18.8	20.9	25.8	22.8	21.2	16.7	17.0
SK2/SK3	Roadside	N	38.2	<b>40.4</b>	<b>42.2</b>	<b>43.1</b>	37.8 <sup>a</sup>	32.4 <sup>a</sup>	31.4 <sup>a</sup>
SK4/SK32/SK33	Roadside	Y	<b>48.3</b>	<b>52.9</b>	<b>58.2</b>	<b>58.5</b>	<b>51.6</b>	<b>46.0</b>	<b>46.5</b>
SK5	Roadside	N	15.8	22.8	21.5	20.8	17.4	13.2	15.0
SK6	Roadside	N	<b>41.7</b>	<b>43.3</b>	<b>49.9</b>	<b>51.7</b>	39.8	36.2 <sup>a</sup>	38.5
SK7	Roadside	N	38.4	<b>41.9</b>	<b>44</b>	<b>47.5</b>	<b>40.3</b>	35.2	38.3
SK8/SK9	Roadside	N	38.3	<b>40.2</b>	<b>46.2</b>	<b>42.8</b>	35.4	33.8	34.9
SK10	Urban Background	N	18	20	21	22.6	19.9	16.6	16.4
SK11	Roadside	N	33	36.1	35.7	35.8	33.1	27.0	28.5
SK12/SK57/SK58	Roadside	Y	35	39.1	<b>45.5</b>	<b>43.2</b>	38.3	33.3	34.5
SK13	Roadside	N	27.8	29.6	34	<b>44.0</b>	31.4	29.5	26.5
SK14	Roadside	N	20.8	24	25	25.1	24.2	19.0	19.1
SK15	Roadside	N	39.8	30.2	27.8	27.5	26.5	20.7	21.5
SK16	Near Roadside	N	-	-	-	-	-	17.6 <sup>a</sup>	17.4
SK17	Roadside	N	23.6	27.3	24.5	26.0	24.6	20.2	20.7
SK18/SK19	Roadside	Y	-	-	-	-	-	33.3 <sup>a</sup>	36.6
SK20/SK21	Roadside	N	26.2	29.1	34.6	37.2	34.5	27.3	25.0
SK22	Roadside	N	28.3	30.8	33.1	33.4	29.6	23.9 <sup>a</sup>	24.3
SK23/SK24	Roadside	Y	28.3	30.8	33.1	33.4	29.6	23.9 <sup>a</sup>	35.3
SK25/SK26	Roadside	N	24.6	26.6	29	29.3	27.4	25.8 <sup>a</sup>	25.8

## South Kesteven District Council

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$						
			2008 (Bias Adjustment Factor = 0.93)	2009 (Bias Adjustment Factor = 0.99)	2010 (Bias Adjustment Factor = 0.83)	2011 (Bias Adjustment Factor = 0.84)	2012 (Bias Adjustment Factor = 0.84)	2013 (Bias Adjustment Factor = 0.73)	2014 (Bias Adjustment Factor = 0.76)
SK27	Roadside	N	22.6	23.5	30.8	28.1	23.9	23.3	20.7
SK28/SK29	Roadside	Y	34.1	34.2	38.2	<b>40.7</b>	35.4	27.7 <sup>a</sup>	30.6
SK30	Roadside	Y	30.1	31	31.4	34.4	31.2	26.6	27.0
SK31	Roadside	Y	28.1	32.3	32.5	33.2	29.2	27.9	24.9
SK34	Urban Background	N	15.8	18.2	18.6	16.8	16.7 <sup>a</sup>	13.4 <sup>a</sup>	13.5
SK35/SK36	Roadside	N	-	-	-	-	-	32.9 <sup>a</sup>	34.6
SK37/SK38	Roadside	Y	<b>50.6</b>	<b>57</b>	<b>49</b>	<b>51.1</b>	<b>46.3</b>	<b>41.4<sup>a</sup></b>	<b>45.5</b>
SK39/SK40	Roadside	Y	<b>42.3</b>	<b>47.4</b>	<b>50.1</b>	<b>59.1</b>	<b>51.2</b>	<b>44.7<sup>a</sup></b>	37.9
SK41/SK42/SK43	Roadside	Y	-	26.4	33.3	33.1	31.4	26.5	21.8 <sup>a</sup>
SK44	Urban Background	N	-	26.4	33.3	33.1	31.4	26.5	15.3
SK45/SK46	Roadside	N	39.1	<b>41.9</b>	<b>42.4</b>	<b>43.5</b>	36.9	28.1 <sup>a</sup>	32.1
SK47/SK48/SK49	Roadside	Y	<b>40.5</b>	<b>42.8</b>	<b>49.1</b>	<b>45.0</b>	<b>41.0</b>	36.7	37.3
SK50/SK51	Roadside	Y	-	-	-	-	-	30.2 <sup>a</sup>	31.3
SK52/SK53	Roadside	Y	<b>42.4</b>	<b>43.4</b>	<b>48.4</b>	<b>45.4</b>	<b>42.3</b>	36.2 <sup>a</sup>	38.2
SK54	Roadside	N	28.4	29.6	31.4	32.4	32.5	31.7	26.6 <sup>a</sup>
SK55/SK56	Roadside	Y	<b>41</b>	<b>48.7</b>	<b>48.2</b>	<b>49.3</b>	<b>47.6</b>	34.7 <sup>a</sup>	39.6
SK59/S60	Roadside	Y	<b>50.5</b>	<b>56</b>	<b>63.5</b>	<b>63.7</b>	<b>57.5</b>	<b>44.2<sup>a</sup></b>	<b>45.1</b>

<sup>a</sup> Results were annualised in accordance with the methodology laid out in Defra Technical Guidance TG(09) Box 3.2

Figure 2.3: Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites

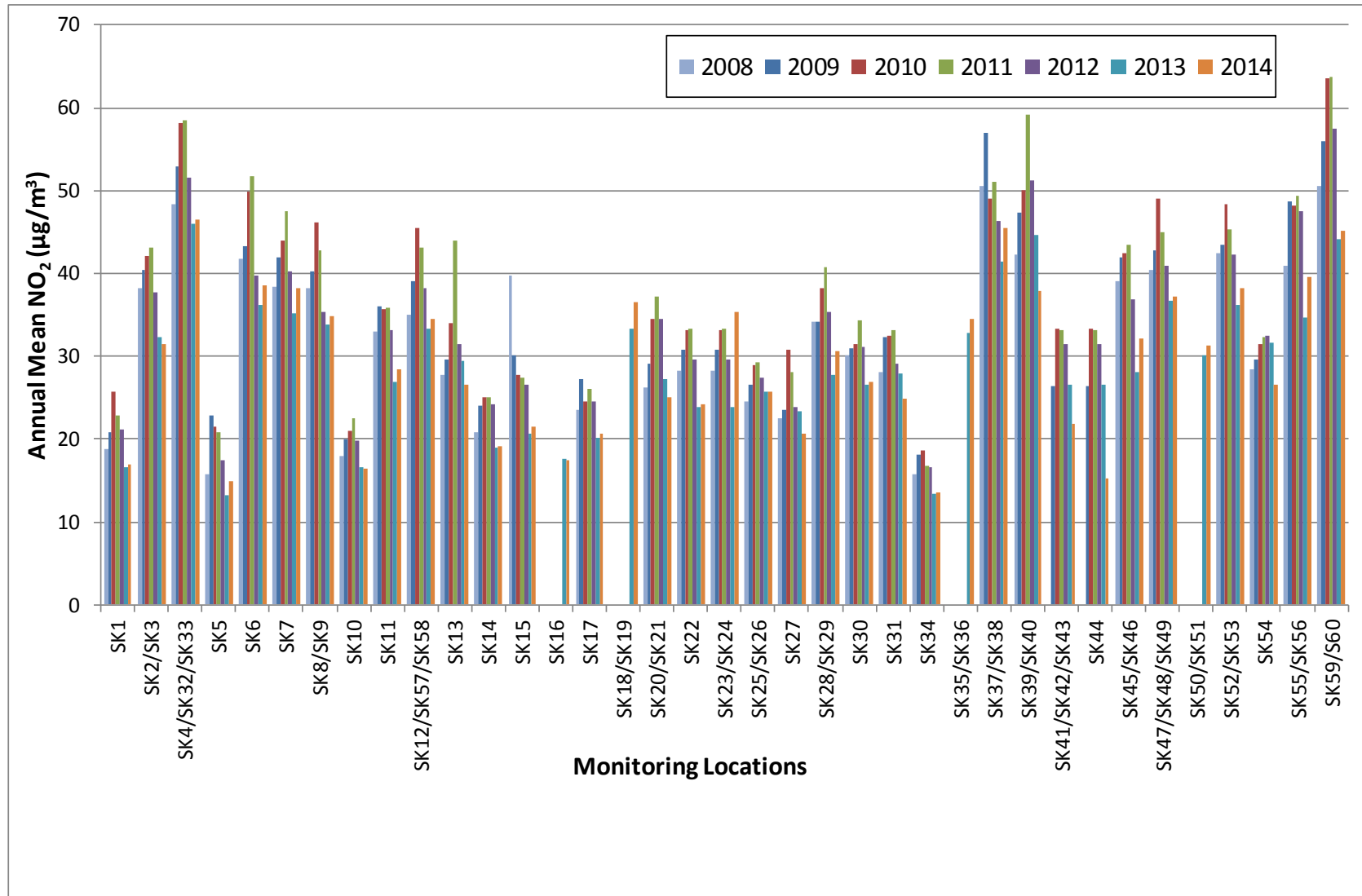


Figure 2.3 above shows the trend analysis for NO<sub>2</sub> concentration at all of the diffusion tube monitoring sites located within South Kesteven District Council. For the sites where the annual mean NO<sub>2</sub> AQS objective has been exceeded for a number of years, 2014 concentrations have been lower than previous year's concentrations. The concentration at site SK39/40 in 2014 was below the AQS objective for the first time during the monitoring period shown. There were no exceedences of the NO<sub>2</sub> AQS annual mean objective at any site outside of the declared AQMA in Grantham.

### **2.2.2 Particulate Matter (PM<sub>10</sub>)**

South Kesteven District Council does not undertake any monitoring of PM<sub>10</sub>.

### **2.2.3 Sulphur Dioxide (SO<sub>2</sub>)**

South Kesteven District Council does not undertake any monitoring of SO<sub>2</sub>.

### **2.2.4 Benzene (C<sub>6</sub>H<sub>6</sub>)**

South Kesteven District Council does not undertake any monitoring of Benzene.

### **2.2.5 Other pollutants monitored**

No other pollutants were monitored within the District during 2014.

### **2.2.6 Summary of Compliance with AQS Objectives**

South Kesteven District Council undertook NO<sub>2</sub> monitoring using passive diffusion tubes across the District at 37 locations throughout 2014. This is the same as for 2013, but the number of diffusion tubes maintained at these locations has decreased in 2014.

There were no measured exceedences of the annual mean objective for NO<sub>2</sub> outside of the existing AQMA in 2014. It should be noted that results in 2014 were adjusted using a national bias adjustment factor, which in 2014 was based on one co-location study only; as such they should be treated with caution.

Three sites exceeded the NO<sub>2</sub> annual mean AQS objective in 2014; these were SK4/SK32/SK33, SK37/SK38, and SK59/SK60. All of these sites are located within the current AQMA in Grantham.

South Kesteven District Council has examined the results from monitoring in the District.

Concentrations within the AQMA still exceed the annual mean AQS objective for NO<sub>2</sub> at relevant locations, therefore the AQMA should remain.

Concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

## **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.

No roads have been identified within South Kesteven District Council as meeting this requirement other than those already identified within the designated Grantham AQMA.

South Kesteven District Council confirms 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 South Kesteven District Council as meeting this requirement other than those already identified within the designated Grantham AQMA.

South Kesteven District Council confirms 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 or HGV's would be one where the proportion of these vehicles within the daily traffic flow is greater than 20%.

South Kesteven District Council confirms 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 following 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.

South Kesteven District Council confirms 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

Since the last round of Review and Assessment, one new road has been proposed within South Kesteven. A planning application has been approved with conditions (S13/0775) for the construction of the Southern Quadrant Link Road (SQLR) comprising of a new single carriageway road of 3km in length.

An Air Quality Assessment (AQA) was completed as part of the Environmental Impact Assessment (EIA) submitted with the planning application that assessed both the construction and operational impacts of the proposal. Predictions of pollutant concentrations within the AQA have been made using the ADMS Roads dispersion model.

The AQA states that in respect to the annual mean NO<sub>2</sub> AQS objective, the overall number of identified receptors that experience an exceedence would fall as a result

of the proposed scheme. However, new exceedences are predicted to be introduced at Rosemary Crescent and Welwyn Close.

In accordance with Defra Technical Guidance TG(09), due to the proposed SQLR introducing new exceedences of the annual mean AQS NO<sub>2</sub> objective at relevant receptor locations outside of the existing AQMA, it may be necessary at a future stage to proceed to a Detailed Assessment.

At the present time, the transport figures used within the SQLR assessment are being revised. Once these have been completed and the potential impacts assessed, the requirement to undertake a Detailed Assessment can be concluded on.

South Kesteven District Council has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that **it may be necessary to proceed to a Detailed Assessment for annual mean NO<sub>2</sub>** at some future point, once further assessment of the SQLR scheme has been completed.

### 3.6 Roads with Significantly Changed Traffic Flows

South Kesteven District Council confirms 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%.

South Kesteven District Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

### 3.7 Bus and Coach Stations

The assessment considers both NO<sub>2</sub> and PM<sub>10</sub> emissions at bus stations that are not enclosed with greater than 2,500 movements per day.

South Kesteven District Council confirms that there are no relevant bus stations in the Local Authority area.



## 4 Other Transport Sources

### 4.1 Airports

South Kesteven District Council confirms that there are no airports in the Local Authority area.

### 4.2 Railways (Diesel and Steam Trains)

The assessment for stationary trains considers SO<sub>2</sub> emissions, while the assessment for moving diesel trains considers NO<sub>2</sub> emissions. If there are no railways carrying diesel or steam trains in the local authority area, there is no need to proceed further with this section.

#### 4.2.1 Stationary Trains

South Kesteven District Council confirms 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

Railway lines with a heavy traffic of diesel passenger trains are listed within the Defra Technical Guidance TG(09). Of the railway lines listed, none pass through South Kesteven.

South Kesteven District Council confirms 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)

Defra Technical Guidance TG(09) states that ports should be assessed where there are between 5,000 and 15,000 movements per year taking place and there is exposure within 250m, or where there are over 15,000 movements per year and exposure within 1km.

## South Kesteven District Council

South Kesteven District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

## 5 Industrial Sources

### 5.1 Industrial Installations

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

South Kesteven District Council confirms 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

South Kesteven District Council confirms 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

A planning application has been approved (S15/0586) for an additional spray booth to be installed at BSC House, Pinfold Road, Bourne, PE10 9HT where one spray booth is in operation with the process of coating metal and plastics. Due to the annual solvent consumption increasing to be in excess of 1 tonne per annum, the applicant is required to apply for the necessary permit(s) prior to the commencement of proposed activities.

South Kesteven District Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

### 5.2 Major Fuel (Petrol) Storage Depots

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

### 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<sup>3</sup> of petrol; and
- A busy road nearby, one with more than 30,000 vehicles per day.

South Kesteven District Council confirms that there are no petrol stations meeting the specified criteria.

### 5.4 Poultry Farms

In England, Wales and Northern Ireland, poultry farms with a capacity greater than 40,000 birds are permitted by the Environmental Agency under the Environmental Permitting Regulations. In addition the following guidance has been produced within Defra Technical Guidance TG(09) to screen the requirement for assessment of poultry farms in terms of LAQM:

- Farms housing in excess of:
  - 400,000 birds if mechanically ventilated;
  - 200,000 birds if naturally ventilated; and
  - 100,000 birds for any turkey unit.
- Relevant exposure within 100m of the poultry units.

South Kesteven District Council confirms that there are no poultry farms meeting the specified criteria.

## 6 Commercial and Domestic Sources

### 6.1 Biomass Combustion – Individual Installations

South Kesteven District Council have identified the following biomass installations that have not previously been assessed within Review and Assessment and have a power output of greater than 50kW.

- **Erection of 5no biomass heating packaged plant rooms to provide heating to 10 no. existing turkey rearing sheds – 5 x 201kW (Ref. S14/2008)**  
Approved conditionally on 3<sup>rd</sup> October 2014  
Stowgate Farm  
Deeping St James  
PE6 8RW
- **Demolition of shed and single storey extension to house biomass boiler – 200kW (Ref. S14/2022)**  
Approved conditionally on 17<sup>th</sup> September 2014  
The Old Rectory  
Bitchfield Road, Ingoldsbury  
Grantham  
NG33 4EU
- **Erection of a timber clad biomass boiler container/Installation of containerised biomass boiler system – 100kW (Refs. 13/3221 and 13/222)**  
Approved conditionally on 6<sup>th</sup> February 2014  
The Six Bells  
Main Street, Witham On The Hill  
Bourne  
PE10 0JH

The installations listed above have been screened using the Biomass Calculator Tool<sup>1</sup> with PM<sub>10</sub> and NO<sub>2</sub> annual mean background mapping data taken from Defra Background Mapping Tool<sup>2</sup>; both of these tools are available on the Defra LAQM website. The outputs of the calculator are presented in Appendix C: LAQM Biomass Calculator Output and the input data is listed below in Table 6.1, Table 6.2 and Table 6.3.

**Table 6.1: Stowgate Farm Biomass Data**

Parameter	Value
Building Height (Tallest building within 5 x stack height) (m)	4.75
Stack Diameter (mm)	250
Stack Height (m)	6
PM <sub>10</sub> Annual Mean Background (µg/m <sup>3</sup> )	17.56
NO <sub>2</sub> Annual Mean Background (µg/m <sup>3</sup> )	10.68
Target Emission Rate PM <sub>10</sub> (g/s)	0.0138
Target Emission Rate Annual NO <sub>x</sub> (g/s)	0.0832
Target Emission Rate Hourly NO <sub>x</sub> (g/s)	0.0421

The emission rates for one 201kW rated biomass boiler planned at Stowgate Farm are 0.012 g/s for Particulate Matter and 0.019 g/s for NO<sub>x</sub>; these emission rates have been estimated from the technical specifications of the boiler and using the Environmental Protection UK (EPUK) Biomass Unit Conversion and Screening Tool<sup>3</sup>. Within the application S14/2008 it is planned to install five biomass boilers at Stowgate Farm. All of the installations are of the same technical and sizing specification; therefore the combined emissions for Stowgate Farm, calculated by multiplying the emissions of one installation by five, are 0.06 g/s for Particulate Matter and 0.095 for NO<sub>x</sub>. These are in exceedence of the target emission rates produced by the Biomass Calculator Tool for both PM<sub>10</sub> and NO<sub>x</sub>, as given in Table 6.1.

Consequently, an additional level of assessment has been completed for the combined biomass emissions (i.e. from the five proposed boilers) using the screening model ADMS-Screen. The completion of this assessment has shown that the AQS objectives for NO<sub>2</sub> and PM<sub>10</sub> would not be exceeded at distances from the source relevant to residential receptors. There are a few residential properties within 300m

<sup>1</sup> Biomass Calculator Tool 6, an Excel spreadsheet reproduction of the graphs published in Defra Technical Guidance TG(09)

<sup>2</sup> Defra Background Mapping Tool, available online at <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>

<sup>3</sup> Biomass Unit Conversion and Screening Tool, downloadable from <http://iaqm.co.uk/guidance/>

of the installation; the maximum annual mean concentration at this distance (inclusive of the local background concentrations) has been estimated at 11.06  $\mu\text{g}/\text{m}^3$  and 17.84  $\mu\text{g}/\text{m}^3$  for  $\text{NO}_2$  and  $\text{PM}_{10}$  respectively<sup>4</sup>. As these predicted concentrations are well below the annual mean AQS objectives, a Detailed Assessment is therefore not required for Stowgate Farm.

**Table 6.2: The Old Rectory Biomass Data**

Parameter	Value
Building Height (Tallest building within 5 x stack height) (m)	5.6
Stack Diameter (mm)	275
Stack Height (m)	6.6
$\text{PM}_{10}$ Annual Mean Background ( $\mu\text{g}/\text{m}^3$ )	17.69
$\text{NO}_2$ Annual Mean Background ( $\mu\text{g}/\text{m}^3$ )	9.18
Target Emission Rate $\text{PM}_{10}$ (g/s)	0.0115
Target Emission Rate Annual $\text{NO}_x$ (g/s)	0.0721
Target Emission Rate Hourly $\text{NO}_x$ (g/s)	0.0343

The emission rates for the biomass boiler planned at The Old Rectory are 0.0024 g/s for Particulate Matter and 0.03 g/s for  $\text{NO}_x$ , these emission rates have been estimated from information available and the procedure given within Defra Technical Guidance TG(09), Box 5.8 D.1a. The emission rates are below the target emission rates produced by the Biomass Calculator Tool for both  $\text{PM}_{10}$  and  $\text{NO}_x$ .

**Table 6.3: The Six Bells Biomass Data**

Parameter	Value
Building Height (Tallest building within 5 x stack height) (m)	9
Stack Diameter (mm)	200
Stack Height (m)	10
$\text{PM}_{10}$ Annual Mean Background ( $\mu\text{g}/\text{m}^3$ )	16.28
$\text{NO}_2$ Annual Mean Background ( $\mu\text{g}/\text{m}^3$ )	9.81
Target Emission Rate $\text{PM}_{10}$ (g/s)	0.0126
Target Emission Rate Annual $\text{NO}_x$ (g/s)	0.0706
Target Emission Rate Hourly $\text{NO}_x$ (g/s)	0.034

The emission rates for the biomass boiler planned at The Six Bells are 0.0013 g/s for Particulate Matter (as Dust) and 0.0083 g/s for  $\text{NO}_x$ , these emission rates have been estimated from information available and the procedure given within Defra Technical

<sup>4</sup> 100%  $\text{NO}_x$  conversion to  $\text{NO}_2$  assumed, consistent with Environment Agency Air Quality Modelling and Assessment Unit (AQMAU) guidance, Conversion Ratios for  $\text{NO}_x$  and  $\text{NO}_2$ .

Guidance TG(09), Box 5.8 D.1a. The emission rates are below the target emission rates produced by the Biomass Calculator Tool for both PM<sub>10</sub> and NO<sub>x</sub>.

South Kesteven District Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

## **6.2 Biomass Combustion – Combined Impacts**

South Kesteven District Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

## **6.3 Domestic Solid-Fuel Burning**

The assessment considers SO<sub>2</sub> emissions (only) from significant areas of residential properties that use solid fuel to heat their homes. ‘Significant’ areas are those of about 500 x 500m with more than 50 houses burning coal/smokeless fuel as their primary source of heating. PM<sub>10</sub> from domestic solid fuel burning is covered under the biomass combustion combined impacts section above.

South Kesteven District Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.



## 7 Fugitive or Uncontrolled Sources

The assessment of fugitive and uncontrolled sources considers the PM<sub>10</sub> objectives, this includes considerations to quarries, landfill sites, opencast coal mining, waste transfer sites and materials handling (i.e. ports, major construction sites). Only locations not covered by the previous rounds of review and assessment, or where there is new relevant exposure, requiring consideration. In the case of proposed new sources, these are only required to be considered if planning approval has been granted.

An application has been received for a proposed quarry at the Land off Gorse Lane, Grantham (S15/1611). An Environmental Impact Assessment (EIA) has been completed as part of the application including an Air Quality and Dust Assessment; a decision has not been made on the application as of yet therefore the impacts of the proposed quarry have not been assessed within the USA.

South Kesteven District Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

## **8 Conclusions and Proposed Actions**

### **8.1 Conclusions from New Monitoring Data**

A review of the 2014 monitoring data found that there were three monitoring sites where the annual mean NO<sub>2</sub> AQS objective was exceeded in 2014; these were SK4/SK32/SK33, SK37/SK38, and SK59/SK60. There are no sites where the annual mean is greater than 60 µg/m<sup>3</sup>, therefore in accordance with Defra Technical Guidance TG(09) there are no sites likely to be at risk of exceeding the 1-hour mean AQS objective.

The three sites where exceedences of the NO<sub>2</sub> were recorded are located within the existing AQMA. There were no exceedences of any AQS objective recorded outside of the existing AQMA.

It should be noted that 2013 and 2014 results were adjusted using a national bias adjustment factor based on one co-location study only, whereas previous years' factors were based on several studies; as such these results should be treated with more caution than previous years.

### **8.2 Conclusions from Assessment of Sources**

#### **8.2.1 Commercial and Domestic Sources**

South Kesteven District Council has received three applications for the installation of a biomass boiler(s) that have the potential to impact the air quality within the District. The emission rates of the proposed biomass boilers have been assessed against target emission rates given by the Biomass Calculator Tool using the technical specifications of the installations, or the resultant pollutant concentrations assessed directly against the relevant AQS objectives using the ADMS-Screen model. In all three cases, the emission rates of the installations for both annual mean PM<sub>10</sub> and NO<sub>2</sub> were either below the target emission rates given by the Biomass Calculator or below the AQS objectives, therefore a Detailed Assessment was not required.

An application has been approved for the installation of an additional spray booth at a location where operations include the coating of metals and plastics. The applicant

has been informed that an environmental permit is required prior to the commencement of the proposed activities.

### **8.2.2 Fugitive or Uncontrolled Sources**

An application has been received for a proposed quarry within South Kesteven, at the present time this application is still being decided upon. As per Defra Technical Guidance TG(09) should be assessed within Review and Assessment if planning permission is granted.

## **8.3 Proposed Actions**

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

- Continue non-automatic monitoring of NO<sub>2</sub> using diffusion tubes to identify future changes in pollutant concentrations;
- The Grantham AQMA is to remain due to a number of exceedences of the AQS NO<sub>2</sub> annual mean objective;
- Review the need for a possible Detailed Assessment in the Rosemary Crescent and Welwyn Close area of Grantham, once assessment of the SQLR scheme is complete; and
- Proceed to an Annual Progress Report in 2016.

## 9 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](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)
- Biomass Calculator Tool, available at <http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html#biomass>
- EPUK Biomass Unit Conversion and Screening Tool, available at <http://iaqm.co.uk/guidance/>
- H1 Environmental Risk Assessment Consultation Document 2013, Annex F – Air Emissions. Published by the Environment Agency
- South Kesteven District Council 2012 Updating and Screening Assessment
- South Kesteven District Council 2014 Annual Progress Report

# Appendices

Appendix A: QA/QC Data

Appendix B: Diffusion Tube Monitoring Data

Appendix C: LAQM Biomass Calculator Output

## Appendix A: QA/QC Data

### Diffusion Tube Bias Adjustment Factors

Diffusion tube data obtained for the year 2014 was supplied and analysed by Environmental Scientifics Group (ESG), the tubes were prepared using the 50% trithanolamine (TEA) in acetone preparation method. The bias adjustment factor for ESG Glasgow is 0.76 (based on one study, version 03\_15) as derived from the national bias adjustment calculator<sup>5</sup>.

For previous years data presented (2008 to 2013), the bias adjustment factors have been taken from the Council's previous LAQM reports. The factors used were 0.93 (2008), 0.99 (2009), 0.83 (2010), 0.84 (2011), 0.84 (2012), 0.73 (2013).

### Discussion of Choice of Factor to Use

Data has been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentrations and continuous monitoring, the latter assumed to be a more accurate method of monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data from NO<sub>x</sub>/NO<sub>2</sub> continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

South Kesteven District Council does not operate any continuous monitors within the District and therefore a co-located study is not available to derive a local bias factor, thus the national bias adjustment calculator has been used.

### PM Monitoring Adjustment

South Kesteven District Council does not complete any PM<sub>10</sub> monitoring within the District.

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<sup>5</sup> National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/15 published in March 2015.

### Short-term to Long-term Data Adjustment

For the 2014 diffusion tube data, annualisation was required at 7 sites. This has been completed in line Defra Technical Guidance LAQM.TG(09) Box 3.2 and details of the annualisation have been provided in Table B2.

### QA/QC of Diffusion Tube Monitoring

ESG Glasgow is a UKAS accredited laboratory and participates in the AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP))<sup>6</sup> for NO<sub>2</sub> tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO<sub>2</sub> concentrations are reported to a high level of accuracy. The laboratory follows the procedures as outlined within its Harmonisation Practical Guidance.

In the 2014 WASP/AIR-PT results, rounds WASP 124 (January to March 2014), AIR-PT AR001 (April to May 2014), AR003 (June to July 2014) and AR004 (October to November 2014) ESG Glasgow has scored 100%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of  $< \pm 2$ .

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<sup>6</sup> <http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-%28April-2013--February-2015%29-NO2-report.pdf>

## Appendix B: Diffusion Tube Monitoring Data

Table B1: Monthly NO<sub>2</sub> Concentrations - Diffusion Tube Sites (2014)

Site ID	NO <sub>2</sub> Concentrations (µg/m <sup>3</sup> )												% Data Capture	Average Concentration (µg/m <sup>3</sup> )
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
SK 1	30.6	29.2	22.8	19.5	18.4	10.3	13.1	21.9	14.0	-	29.4	37.1	91.7	22.4
SK 2	43.5	42.0	-	42.9	42.2	39.4	40.7	-	-	-	53.0	45.4	66.7	43.6
SK 3	44.6	40.7	-	44.5	42.7	16.8	41.7	-	-	-	46.4	47.5	66.7	40.6
SK 4	68.5	54.9	66.2	54.7	56.1	57.0	53.1	48.1	62.5	-	75.0	57.3	91.7	59.4
SK 5	27.3	24.2	22.9	15.0	15.1	9.6	9.9	15.9	13.9	-	35.2	27.7	91.7	19.7
SK 6	62.9	55.7	63.0	49.3	49.7	39.2	39.5	39.1	-	-	54.9	52.7	83.3	50.6
SK 7	64.8	58.0	59.1	42.7	46.9	35.2	36.1	38.4	-	-	57.5	65.2	83.3	50.4
SK 8	51.2	42.9	53.4	45.7	44.0	42.2	43.4	39.5	51.5	-	56.6	41.0	91.7	46.5
SK 9	51.0	45.4	50.1	40.9	44.2	42.9	40.6	38.8	45.0	-	55.8	44.2	91.7	45.4
SK 10	29.8	26.9	24.2	18.2	16.5	14.8	13.5	18.0	11.3	-	36.1	27.6	91.7	21.5
SK 11	46.7	41.1	45.1	36.8	-	26.4	29.0	34.5	25.1	-	46.9	44.1	83.3	37.6
SK 12	46.0	43.9	50.2	42.0	46.0	38.3	42.1	38.5	27.0	-	50.6	53.2	91.7	43.4
SK13	41.0	31.8	40.9	34.6	-	34.0	29.1	29.9	30.9	-	42.0	34.3	83.3	34.9
SK 14	31.3	23.7	33.4	22.4	23.6	20.8	17.6	22.7	27.9	-	25.6	28.0	91.7	25.2
SK 15	35.9	30.1	33.6	25.9	26.5	23.9	23.8	25.6	18.1	-	32.6	35.2	91.7	28.3
SK 16	31.2	28.4	28.7	14.8	18.6	17.3	18.3	18.0	17.7	-	35.7	23.0	91.7	22.9
SK 17	36.9	32.5	29.7	23.4	24.7	19.1	21.4	22.6	18.5	-	34.9	36.5	91.7	27.3
SK 18	61.9	48.8	56.0	47.5	47.1	40.3	40.4	44.6	39.7	-	58.9	57.1	91.7	49.3
SK 19	57.3	40.7	52.0	45.9	49.4	44.8	46.3	39.1	40.3	-	47.9	52.6	91.7	46.9
SK 20	38.4	40.7	-	33.8	34.4	-	32.3	-	22.7	-	40.5	-	58.3	34.7
SK 21	30.5	31.4	40.4	30.3	35.0	26.3	29.8	32.9	26.1	-	40.6	-	83.3	32.3
SK 22	39.7	37.7	36.6	27.5	31.4	22.5	27.0	29.2	19.5	-	40.2	40.4	91.7	32.0
SK 23	46.1	53.6	46.5	41.1	46.4	39.5	41.7	46.1	36.8	-	49.8	51.1	91.7	45.3
SK 24	51.4	57.2	50.1	42.1	48.3	36.7	40.1	45.9	42.5	-	52.2	57.2	91.7	47.6
SK 25	40.6	37.0	30.2	25.5	32.8	-	33.1	24.0	21.2	-	40.6	47.0	83.3	33.2
SK 26	33.5	36.7	32.0	27.5	30.3	-	19.6	47.0	29.5	-	42.0	49.6	83.3	34.8
SK 27	31.4	30.9	29.5	23.0	23.5	17.9	20.1	24.1	23.6	-	39.1	36.9	91.7	27.3



## South Kesteven District Council

SK 28	50.0	46.9	39.8	38.4	39.6	31.1	30.3	35.3	31.3	-	52.7	44.9	91.7	40.0
SK 29	50.3	45.9	43.6	37.8	39.0	30.5	30.5	37.9	34.8	-	51.8	42.1	91.7	40.4
SK 30	39.8	42.2	39.1	31.7	37.1	26.9	27.5	34.1	27.0	-	40.3	44.7	91.7	35.5
SK 31	41.4	39.8	33.0	30.3	32.9	23.5	24.1	30.9	16.4	-	41.7	46.9	91.7	32.8
SK 32	92.6	64.5	70.8	64.8	62.8	52.8	56.9	48.4	55.9	-	76.6	60.0	91.7	64.2
SK 33	70.3	48.0	59.8	59.3	58.6	59.3	59.3	54.6	54.0	-	79.9	58.2	91.7	60.1
SK 34	22.1	21.1	20.5	13.2	15.0	9.7	11.5	15.1	12.4	-	27.6	27.4	91.7	17.8
SK 35	55.8	45.8	47.2	40.0	35.3	35.7	42.7	-	41.2	-	64.1	55.7	83.3	46.3
SK 36	53.5	49.5	50.6	40.4	42.4	33.8	41.5	42.7	34.7	-	61.5	40.6	91.7	44.6
SK 37	65.3	57.6	66.5	61.1	62.1	50.3	54.1	53.7	53.7	-	83.4	65.1	91.7	61.2
SK 38	65.2	62.9	58.4	58.8	65.2	56.2	54.1	53.4	47.2	-	81.1	42.3	91.7	58.6
SK 39	59.8	49.4	45.8	49.2	53.2	34.6	41.0	51.8	32.3	-	69.7	61.2	91.7	49.8
SK 40	57.7	56.2	54.2	39.2	43.7	42.0	40.2	46.9	45.0	-	69.3	55.8	91.7	50.0
SK 41	34.4	34.2	35.9	-	-	-	-	-	-	-	-	-	25.0	34.8
SK 42	37.0	35.6	35.4	-	-	-	-	-	-	-	-	-	25.0	36.0
SK 43	40.9	35.3	32.5	-	-	-	-	-	-	-	-	-	25.0	36.2
SK 44	26.4	23.5	21.7	16.9	14.9	-	11.9	16.3	11.9	-	29.0	28.4	83.3	20.1
SK 45	48.1	47.7	41.5	40.7	36.1	33.7	38.6	40.0	33.7	-	55.3	50.6	91.7	42.4
SK 46	46.7	48.2	43.1	35.1	45.1	30.6	39.9	38.4	32.9	-	52.2	51.4	91.7	42.1
SK 47	54.6	50.1	43.3	52.0	53.5	46.9	42.8	44.7	48.5	-	77.0	48.9	91.7	51.1
SK 48	49.6	38.9	52.0	48.0	53.1	46.5	44.0	39.4	30.5	-	66.9	46.8	91.7	46.9
SK 49	53.7	51.2	43.6	45.1	48.6	47.0	47.2	42.0	48.2	-	70.0	46.1	91.7	49.3
SK 50	52.8	44.8	-	40.5	43.9	28.4	40.5	35.5	33.6	-	49.4	42.6	83.3	41.2
SK 51	37.0	42.9	43.3	36.9	33.0	36.8	41.0	38.2	40.2	-	59.0	43.2	91.7	41.0
SK 52	51.9	44.2	56.9	50.4	47.7	47.3	48.3	-	-	-	65.5	52.8	75.0	51.7
SK 53	50.7	47.7	47.4	46.5	46.6	40.8	49.6	-	-	-	61.5	49.6	75.0	48.9
SK 54	-	37.9	-	26.2	-	26.2	29.1	32.0	24.7	-	47.8	42.9	66.7	33.4
SK 55	62.4	56.0	49.4	-	50.9	-	49.1	46.1	48.5	-	57.3	58.9	75.0	53.2
SK 56	48.4	49.5	50.2	-	53.8	-	48.1	47.6	40.3	-	61.3	60.2	75.0	51.0
SK 57	45.7	44.1	49.9	44.0	44.2	39.3	44.9	40.6	41.4	-	49.1	49.5	91.7	44.8
SK 58	47.7	48.2	51.9	43.8	42.1	38.9	57.0	60.5	37.2	-	48.1	51.1	91.7	47.9
SK 59	59.5	66.4	53.8	46.9	-	53.9	64.4	59.9	57.6	-	60.1	76.6	83.3	59.9
SK 60	62.1	61.2	64.1	62.8	69.2	-	41.1	42.1	42.6	-	67.8	75.2	83.3	58.8

**Table B2: Short-Term to Long-Term Monitoring Data Adjustment (2014)**

Site ID	Unadjusted Diffusion Tube Mean ( $\mu\text{g}/\text{m}^3$ )	Annualisation Factor Nottingham Centre	Annualisation Factor Leicester University	Annualisation Factor Market Harborough	Average Annualisation Factor	Annualised & Bias Adjusted (0.76) Concentration ( $\mu\text{g}/\text{m}^3$ )
SK2	43.6	0.982	0.987	0.975	0.981	32.55
SK3	40.6	0.982	0.987	0.975	0.981	30.29
SK20	34.7	0.976	1.016	0.894	0.962	25.36
SK41*	34.8	0.884	0.929	0.597	0.803	21.27
SK42*	36.0	0.884	0.929	0.597	0.803	21.98
SK43*	36.2	0.884	0.929	0.597	0.803	22.12
SK54	33.4	1.019	1.001	1.127	1.049	26.59

\* Sites SK 41/42/43 are triplicates.

# Appendix C: LAQM Biomass Calculator Output

## Stowgate Farm

Figure C1: PM<sub>10</sub> Annual Target Emission Rate Output

Review and Assessment Tool for PM <sub>10</sub> from biomass combustion stacks	
The maximum emissions of PM <sub>10</sub> in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedence of the 24 hour objective for PM <sub>10</sub> in England, Wales and Northern Ireland or the annual mean objective in Scotland.	
Enter required information in Cream Cells Resulting Emission in Red Bold	
Building height	<input type="text" value="4.75"/> m
Stack diameter	<input type="text" value="0.25"/> m
Stack height	<input type="text" value="6"/> m
Location (Scotland, Rest of UK)	<input type="text" value="Rest of UK"/>
PM <sub>10</sub> Annual mean background concentration (include roadside contribution at relevant receptors)	<input type="text" value="17.56"/> µg/m <sup>3</sup>
Calculated Effective stack height	<input type="text" value="2.1"/> m
Target Emission Rate	<input type="text" value="0.0138"/> g/s
If the maximum stack emission rate is less than the target above then it is not likely that the most stringent objective for PM <sub>10</sub> will be exceeded	

Figure C2: NO<sub>x</sub> Annual Target Emission Rate Output

Annual mean NO <sub>2</sub> objective	
The target emissions of NO <sub>x</sub> in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedence of the annual mean objective for NO <sub>2</sub>	
Enter required information in Cream Cells Resulting Emission in Red Bold	
Building height	<input type="text" value="4.75"/> m
Stack diameter	<input type="text" value="0.25"/> m
Stack height	<input type="text" value="6"/> m
Location (Scotland, Rest of UK)	<input type="text" value="Rest of UK"/>
NO <sub>2</sub> Annual mean background concentration (include roadside contribution at relevant receptors)	<input type="text" value="10.61"/> µg/m <sup>3</sup>
Calculated Effective stack height	<input type="text" value="2.1"/> m
Target Emission Rate	<input type="text" value="0.0832"/> g/s
If the maximum stack emission rate is less than the target above then it is not likely that the annual mean limit value for NO <sub>2</sub> will be exceeded	

Figure C3: NO<sub>x</sub> Hourly Target Emission Rate Output

Review and Assessment Tool for oxides of nitrogen emissions from biomass combustion stacks	
Hourly mean NO <sub>2</sub> objective	
The target emissions of NO <sub>x</sub> in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedence of the annual mean objective for NO <sub>2</sub>	
Enter required information in Cream Cells Resulting Emission in Red Bold	
Building height	<input type="text" value="4.75"/> m
Stack diameter	<input type="text" value="0.25"/> m
Stack height	<input type="text" value="6"/> m
Location (Scotland, Rest of UK)	<input type="text" value="Rest of UK"/>
NO <sub>2</sub> Annual mean background concentration (include roadside contribution at relevant receptors)	<input type="text" value="10.61"/> µg/m <sup>3</sup>
Calculated Effective stack height	<input type="text" value="2.1"/> m
Target Emission Rate	<input type="text" value="0.0421"/> g/s
If the maximum stack emission rate is less than the target above then it is not likely that the hourly mean objective for NO <sub>2</sub> will be exceeded	

The Old Rectory

Figure C4: PM<sub>10</sub> Annual Target Emission Rate Output

Review and Assessment Tool for PM <sub>10</sub> from biomass combustion stacks	
The maximum emissions of PM <sub>10</sub> in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedence of the 24 hour objective for PM10 in England, Wales and Northern Ireland or the annual mean objective in Scotland.	
Enter required information in Cream Cells Resulting Emission in Red Bold	
Building height	<input type="text" value="5.6"/> m
Stack diameter	<input type="text" value="0.275"/> m
Stack height	<input type="text" value="6.6"/> m
Location (Scotland, Rest of UK)	<input type="text" value="Rest of UK"/>
PM <sub>10</sub> Annual mean background concentration (include roadside contribution at relevant receptors)	<input type="text" value="17.69"/> µg/m <sup>3</sup>
Calculated Effective stack height	<input type="text" value="1.7"/> m
Target Emission Rate	<input type="text" value="0.0115"/> g/s
If the maximum stack emission rate is less than the target above then it is not likely that the most stringent objective for PM <sub>10</sub> will be exceeded	

Figure C5: NO<sub>x</sub> Annual Target Emission Rate Output

Review and Assessment Tool for oxides of nitrogen emissions from biomass combustion stacks	
Annual mean NO <sub>2</sub> objective	
The target emissions of NO <sub>x</sub> in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedence of the annual mean objective for NO <sub>2</sub>	
Enter required information in Cream Cells Resulting Emission in Red Bold	
Building height	<input type="text" value="5.6"/> m
Stack diameter	<input type="text" value="0.275"/> m
Stack height	<input type="text" value="6.6"/> m
Location (Scotland, Rest of UK)	<input type="text" value="Rest of UK"/>
NO <sub>2</sub> Annual mean background concentration (include roadside contribution at relevant receptors)	<input type="text" value="9.18"/> µg/m <sup>3</sup>
Calculated Effective stack height	<input type="text" value="1.7"/> m
Target Emission Rate	<input type="text" value="0.0721"/> g/s
If the maximum stack emission rate is less than the target above then it is not likely that the annual mean limit value for NO <sub>2</sub> will be exceeded	

Figure C6: NO<sub>x</sub> Hourly Target Emission Rate Output

Review and Assessment Tool for oxides of nitrogen emissions from biomass combustion stacks	
Hourly mean NO <sub>2</sub> objective	
The target emissions of NO <sub>x</sub> in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedence of the annual mean objective for NO <sub>2</sub>	
Enter required information in Cream Cells Resulting Emission in Red Bold	
Building height	<input type="text" value="5.6"/> m
Stack diameter	<input type="text" value="0.275"/> m
Stack height	<input type="text" value="6.6"/> m
Location (Scotland, Rest of UK)	<input type="text" value="Rest of UK"/>
NO <sub>2</sub> Annual mean background concentration (include roadside contribution at relevant receptors)	<input type="text" value="9.18"/> µg/m <sup>3</sup>
Calculated Effective stack height	<input type="text" value="1.7"/> m
Target Emission Rate	<input type="text" value="0.0343"/> g/s
If the maximum stack emission rate is less than the target above then it is not likely that the hourly mean objective for NO <sub>2</sub> will be exceeded	

The Six Bells

Figure C7: PM<sub>10</sub> Annual Target Emission Rate Output

Review and Assessment Tool for PM <sub>10</sub> from biomass combustion stacks	
The maximum emissions of PM <sub>10</sub> in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedance of the 24 hour objective for PM <sub>10</sub> in England, Wales and Northern Ireland or the annual mean objective in Scotland.	
Enter required information in Cream Cells Resulting Emission in Red Bold	
Building height	<input type="text" value="9"/> m
Stack diameter	<input type="text" value="0.2"/> m
Stack height	<input type="text" value="10"/> m
Location (Scotland, Rest of UK)	<input type="text" value="Rest of UK"/>
PM <sub>10</sub> Annual mean background concentration (include roadside contribution at relevant receptors)	<input type="text" value="15.28"/> µg/m <sup>3</sup>
Calculated Effective stack height	<input type="text" value="1.7"/> m
Target Emission Rate	<input type="text" value="0.0126"/> g/s
If the maximum stack emission rate is less than the target above then it is not likely that the most stringent objective for PM <sub>10</sub> will be exceeded	

Figure C8: NO<sub>x</sub> Annual Target Emission Rate Output

Review and Assessment Tool for oxides of nitrogen emissions from biomass combustion stacks	
Annual mean NO <sub>2</sub> objective	
The target emissions of NO <sub>x</sub> in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedance of the annual mean objective for NO <sub>2</sub>	
Enter required information in Cream Cells Resulting Emission in Red Bold	
Building height	<input type="text" value="9"/> m
Stack diameter	<input type="text" value="0.2"/> m
Stack height	<input type="text" value="10"/> m
Location (Scotland, Rest of UK)	<input type="text" value="Rest of UK"/>
NO <sub>2</sub> Annual mean background concentration (include roadside contribution at relevant receptors)	<input type="text" value="9.81"/> µg/m <sup>3</sup>
Calculated Effective stack height	<input type="text" value="1.7"/> m
Target Emission Rate	<input type="text" value="0.0706"/> g/s
If the maximum stack emission rate is less than the target above then it is not likely that the annual mean limit value for NO <sub>2</sub> will be exceeded	

Figure C9: NO<sub>x</sub> Hourly Target Emission Rate Output

Review and Assessment Tool for oxides of nitrogen emissions from biomass combustion stacks	
Hourly mean NO <sub>2</sub> objective	
The target emissions of NO <sub>x</sub> in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedance of the annual mean objective for NO <sub>2</sub>	
Enter required information in Cream Cells Resulting Emission in Red Bold	
Building height	<input type="text" value="9"/> m
Stack diameter	<input type="text" value="0.2"/> m
Stack height	<input type="text" value="10"/> m
Location (Scotland, Rest of UK)	<input type="text" value="Rest of UK"/>
NO <sub>2</sub> Annual mean background concentration (include roadside contribution at relevant receptors)	<input type="text" value="9.81"/> µg/m <sup>3</sup>
Calculated Effective stack height	<input type="text" value="1.7"/> m
Target Emission Rate	<input type="text" value="0.034"/> g/s
If the maximum stack emission rate is less than the target above then it is not likely that the hourly mean objective for NO <sub>2</sub> will be exceeded	