South Holland District Council

Updating And Screening Assessment 2015

Bureau Veritas Air Quality

September 2015

Move Forward with Confidence

Document Control Sheet

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2015 Updating and Screening Assessment for South Holland District Council

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

September, 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 no exceedences of the AQS objectives at any of the monitoring locations within South Holland District Council.

Results from diffusion tube monitoring showed that Nitrogen Dioxide (NO_2) concentrations in 2014 decreased at all monitoring sites compared to 2013. Continuous monitoring results for 2014 indicate that both the annual mean objective and the 1-hour mean objective for NO_2 were met at both locations, showing a decrease in 2014.

Results from automatic Particulate Matter (PM_{10}) monitoring show that both the annual mean objective and the 24-hour objective also continue to be met at both monitoring locations. Both monitoring sites showed a decrease in annual mean concentration in 2014 compared to 2013.

A number of developments have been identified as having the potential to impact air quality, notably a number of applications for biomass installations. Data was only available to screen two of these sites, with an assessment completed using the Biomass Calculator Tool. Both sites were shown to produce emissions lower than the target emission rates given, therefore Detailed Assessments for the installations are not required.

Proposed actions arising from the 2015 Updating and Screening Assessment are as follows:

- Continue automatic monitoring of PM_{10}, NO_2 and O_3 within the District to identify future changes in pollutant concentrations;
- Continue non-automatic monitoring of NO_2 using diffusion tubes to identify future changes in pollutant concentrations;
- Continue to gather emission and stack information for the identified biomass installations to determine their individual and cumulative impact upon air quality within the District; and
- Proceed to an Annual Progress Report in 2016.

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1 Introduction

1.1 Description of Local Authority Area

South Holland District Council comprises the principal town of Spalding surrounded by the smaller towns of Holbeach, Long Sutton, Sutton Bridge and Crowland. The rest of the district is rural in character.

The main source of air pollution in the district is road traffic emissions from major roads, notably the A16, A17 and A151 which connect South Holland with North Lincolnshire and the Humber estuary, and south west Lincolnshire. There are currently no Air Quality Management Areas (AQMAs) declared in South Holland.

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 μg/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

South Holland District Council undertook the First Round of Review and Assessment of air quality between 1998 and 2001 (Stages 1, 2 and 3). The Stage 2 report recommended further assessment of NO_2 and PM_{10} emissions in the Port Sutton Bridge Area and NO_2 emissions along the A17 at Holbeach and Sutton Bridge. The Stage 3 report concluded that predicted concentrations of NO_2 and PM_{10} would be met at these locations and no AQMA was required. The conclusions of the First Round were that all AQS objectives were expected to be met by the target dates based on the available information at that time.

The first phase of the Second Round of Review and Assessment, the USA, was completed in August 2003 and this provided an update with respect to air quality issues in the District. The 2003 USA concluded that no Detailed Assessment of air quality was required. The Progress Reports 2004 and 2005 similarly concluded that all AQS objectives were expected to be met. A new continuous monitoring site was established in 2003 at Monkhouse School in Spalding to monitor PM_{10} and NO_2 concentrations, and assess emissions from Spalding Power Station.

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 in the District. The USA concluded that all objectives were expected to be met and no Detailed Assessment was required. In 2007 and 2008 the Council submitted annual Progress Reports for air quality. The reports considered the latest monitoring data and concluded that no significant changes in pollutant concentrations had occurred and there were no predicted exceedences of the AQS objectives.

The Fourth Round 2009 USA provided a further update on local air quality and concluded that the objectives for benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide and sulphur dioxide would be met and that there was no requirement to undertake a Detailed Assessment for these pollutants. However, the Council confirmed that there were two poultry farms in Spalding that met the relevant assessment criteria and had nearby relevant exposure with respect to the PM_{10} objectives. It was therefore proposed that the Council progress to a Detailed Assessment for PM_{10} at these two poultry farm locations (Fleet Fen Farm Poultry Unit and Chapel Road Poultry Unit) in addition to the 2010 Annual Progress Report.

The Detailed Assessment, which was completed in May 2011, focused on Fleet Fen Farm, near Holbeach, which was considered to be the worst-case scenario due to the farm capacity and proximity of sensitive properties downwind. The report concluded that emissions of PM_{10} from the turkey-rearing units at Fleet Fen Farm did not present a significant risk of breaching the PM_{10} AQS objectives, and that there was no need to declare an AQMA.

The Progress Reports 2010 and 2011 concluded that results at all monitoring sites still complied with the AQS objectives, apart from one kerbside site which, in 2009, exceeded the annual mean NO_2 objective. However, there was no relevant exposure near the site to warrant further consideration and this site met the objective in 2010. Both LAQM Progress Reports recommended the continued monitoring at existing sites.

The 2012 Updating and Screening Assessment (USA) concluded that all monitoring sites complied with the AQS objectives. The USA detailed the new Spalding to Eye link road and the Wygate Park to Bourne End link road and recommended that a new diffusion tube monitoring location be installed along the Spalding to Eye link road to monitor the impact that the new road is having upon local air quality.

The 2013 Progress Report recommended continued monitoring at existing sites and ensuring that the emissions from the biomass installations at Lambs Flowers Ltd and Oppermans Plants Ltd remain within the permitted limits.

The 2014 Progress Report presented 2013 monitoring data and showed that there were no exceedences of the AQS objectives at any of the monitoring locations. It was recommended to continue monitoring at existing sites, to gather emission and stack information for identified biomass installations, and to continue to monitor the biomass installations at Lambs Flowers Ltd and Oppermans Plants Ltd to ensure they remain within the permitted limits.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

South Holland District Council operates two automatic monitoring stations measuring Nitrogen Dioxide (NO_2) using chemiluminescence analysers and particulate matter (PM_{10}) using a Tapered Element Oscillating Microbalance (TEOM) at the following locations:

- Spalding Monkhouse School; and
- Westmere School.

There is also additional monitoring of Ozone (O_3) measured by ultra violet absorption at the Westmere School site. Ozone is a trans-boundary pollutant; the sources of Ozone are frequently spatially distant from the measured site of the concentrations. Ozone is not prescribed in the Regulations for LAQM and is therefore reported here for information only.

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

Figure 2.1: Map of Automatic Monitoring Site: Spalding

Legend

● Automatic Monitoring Site

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Location

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Title

Automatic Monitoring Site: Spalding

By	**Approved**
PB	JC
Scale	**Job Ref**
Not To Scale	6278287
Date	**Figure No.**
July 2015	**2.1**

Figure 2.2: Map of Automatic Monitoring Site: Sutton Bridge

Legend
Automatic Monitoring Site

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Automatic Monitoring Site: Sutton Bridge

By	Approved
PB	JC
Scale	**Job Ref**
Not To Scale	6278287
Date	**Figure No.**
July 2015	**2.2**

Table 2.1: Details of Automatic Monitoring Sites

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?
Spalding Monkhouse School	UB	523168	322454	NO_2, PM_{10}	No	Chemiluminescence, TEOM	Y (1)	25	No
Westmere School	R	547264	321709	NO_2, O_3, PM_{10}	No	Chemiluminescence, UV Absorption, TEOM	Y (14)	190	No

* UB – Urban Background, R – Rural

2.1.2 Non-Automatic Monitoring Sites

South Holland District Council undertook non-automatic monitoring using passive NO_2 diffusion tubes at 15 locations during 2014. This includes a set of triplicate tubes (SH 8/9/10) that are co-located with the continuous monitoring analyser located at Westmere School.

There have been no changes to the NO_2 diffusion tube monitoring network from previous years. The details of the NO_2 monitoring network are shown in Table 2.2 and the locations presented in Figure 2.3, Figure 2.4, Figure 2.5, Figure 2.6 and Figure 2.7.

Figure 2.3: Map of Non-Automatic Monitoring Site: Crowland

Legend

Diffusion Tube Location

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Non-Automatic Monitoring Site: Crowland

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Date	**Figure No.**
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Figure 2.4: Map of Non-Automatic Monitoring Sites: Holbeach and Gedney

Legend

● Diffusion Tube Location

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Non-Automatic Monitoring Sites: Holbeach and Gedney

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Figure 2.5: Map of Non-Automatic Monitoring Sites: Spalding and Pinchbeck

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Diffusion Tube Location

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Non-Automatic Monitoring Sites: Spalding and Pinchbeck

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Scale	**Job Ref**
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Date	**Figure No.**
July 2015	**2.5**

Figure 2.6: Map of Non-Automatic Monitoring Sites: Donington and Surfleet

Legend

Diffusion Tube Location

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Non-Automatic Monitoring Sites: Donington and Surfleet

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Date	**Figure No.**
July 2015	**2.6**

Figure 2.7: Map of Non-Automatic Monitoring Sites: Sutton Bridge

Legend

● Diffusion Tube Location

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Location

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Title

Non-Automatic Monitoring Sites: Sutton Bridge

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PB	JC
Scale	**Job Ref**
Not To Scale	6278287
Date	**Figure No.**
July 2015	**2.7**

Table 2.2: Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type*	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA? (Y/N)	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
SH 1	21 Millfield Gardens	UB	524388	310520	NO_2	N	N	Y (6.8)	2.9	N
SH 2	Nutten Stoven	UB	535595	325453	NO_2	N	N	Y (5.6)	21.8	Y
SH 3	Priory Road	UB	524734	322403	NO_2	N	N	N (38.4)	80	N
SH 4	46 The Hollies	UB	536523	325078	NO_2	N	N	Y (8.4)	0.2	N
SH 5	Station Road	R	526585	328726	NO_2	N	N	Y (24.9)	1.5	Y
SH 6	103 Boston Road	NR	535525	325589	NO_2	N	N	Y (25.7)	9.5	Y
SH 7	Field End	R	541013	324393	NO_2	N	N	Y (5.9)	<2	Y
SH8/9/10	Westmere (Triplicate)	UB	547264	321709	NO_2	N	Y	N (69.4)	61.2	N
SH 11	Metalair Site	R	547957	321013	NO_2	N	N	N	<2	Y
SH 13	Pinchbeck Road	K	524595	323793	NO_2	N	N	Y (20.7)	0.7	Y
SH 14	Springfields Roundabout	K	526309	323820	NO_2	N	N	N (54.2)	0.5	Y
SH 15	Church Street, Pinchbeck	R	524182	325804	NO_2	N	N	Y (0)	1.5	Y
SH 16	Bicker Road, Donington	NR	520917	336064	NO_2	N	N	Y (7.5)	16.5	Y
SH 17	High Road, Spalding	R	524892	322571	NO_2	N	N	Y (0)	1.5	Y
SH 18	Hawthorn Bank, Spalding	R	524191	321328	NO_2	N	N	Y (1.5)	3	Y

* K – Kerbside, NR – Near-Road, R – Roadside, UB – Urban Background

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

There are two AQS objectives for NO_2 presented in Table 1.1, 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 in one year.

Automatic Monitoring Data

South Holland District Council monitored NO_2 at two locations during 2014. These were; Spalding Monkhouse School, an urban background site and Westmere School, a rural site.

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

Data capture was good during 2014, therefore annualisation was not required at either of the monitoring sites.

Results for 2014 indicate that both the annual mean objective and the 1-hour objective were met at both continuous monitoring locations.

Figure 2.8 shows the trend in annual mean NO_2 concentrations from 2008 to 2014 at both of the monitoring locations. There have not been any exceedences of the annual mean objective at either site during the monitoring periods, but the sites present different trends.

There have been two distinct peaks in concentration at Spalding Monkhouse School; in 2008 and 2012. A sharp decrease was experienced after 2008 followed by a gradual increase to the second peak in 2012. Following this peak there has been a decreasing trend apparent through 2013 and 2014. The Westmere School site showed a gradual increasing trend from 2008 to 2010. Following 2010, annual mean concentrations have shown a decreasing trend.

Annual mean NO_2 concentrations in 2014 decreased compared to 2013 levels at both monitoring sites

.

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

Site Name	Site Type*	Within AQMA?	Valid Data Capture for period of monitoring (%)	Valid Data Capture 2014 (%)	Annual Mean NO_2 Concentration (µg/m^3)						
					2008	2009	2010	2011	2012	2013	2014
Spalding Monkhouse School	UB	No	95.2	95.2	15.7	9.9	11.3	11.9	15.3	11.3	10.4
Westmere School	R	No	99.6	99.6	16.2	18.0	18.6	16.2	13.9	12.7	12.1

* UB – Urban Background, R – Rural

Figure 2.8: Trends in Annual Mean Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites

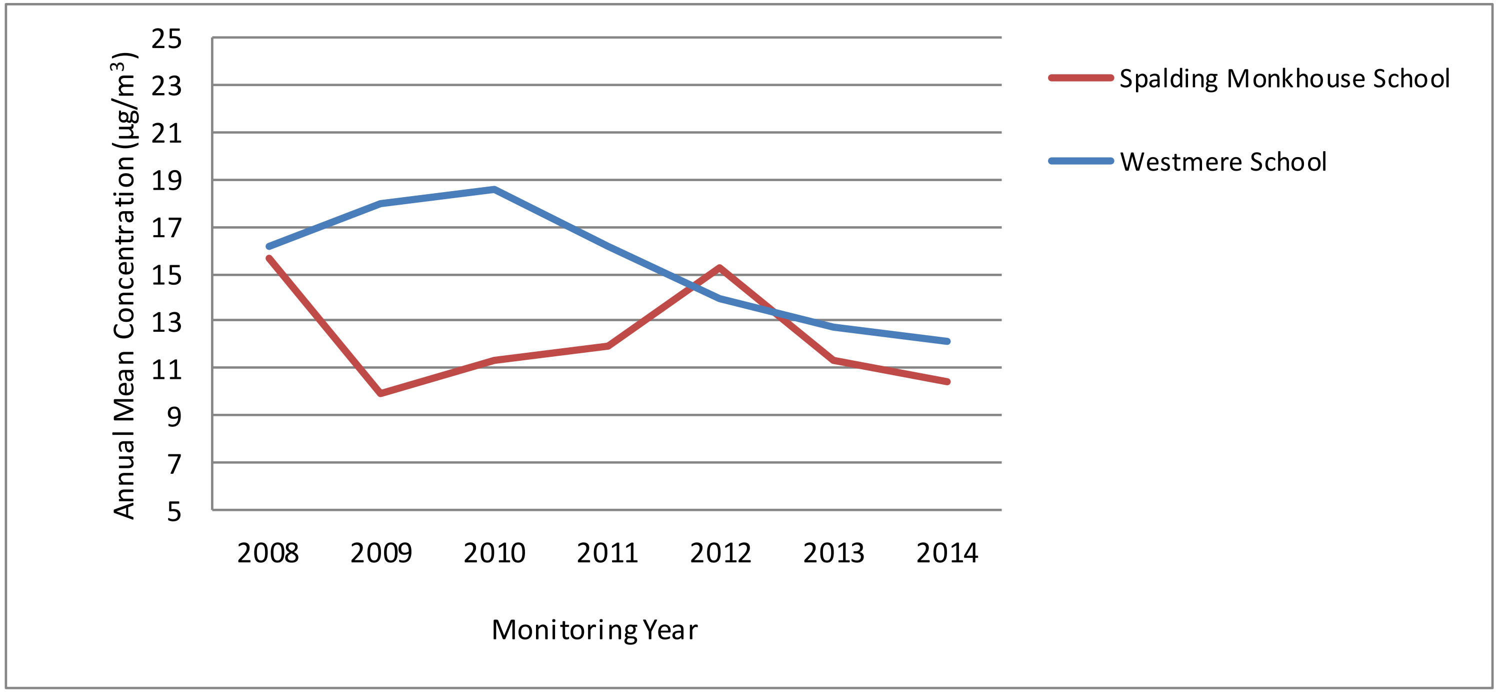


Table 2.4: Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site Name	Site Type*	Within AQMA?	Valid Data Capture for period of monitoring (%)	Valid Data Capture 2014 (%)	Number of Hourly Means >200 µg/m³						
					2008	2009	2010	2011	2012	2013	2014
Spalding Monkhouse School	UB	No	95.2	95.2	0	0	0 (63)	0	0 (84)	0 (55)	0
Westmere School	R	No	99.6	99.6	0	0	0 (156.5)	0	0 (67)	0	0

* UB – Urban Background, R – Rural

Note - If the period of valid data is less than 90%, the 99.8th percentile of hourly means is included in brackets

Diffusion Tube Monitoring Data

The NO_2 diffusion tube data is summarised in Table 2.5 and the full dataset including monthly mean values are included in Appendix B: NO2 Diffusion Tube Monthly Data.

Results from the year 2014 have been bias adjusted using the local bias adjustment factor. The data capture for 2014 was very good at all sites therefore annualisation was not required at any sites. Full details of the bias adjustment and diffusion tube QA/QC procedure are provided in Appendix A: QA/QC Data.

There were no monitoring sites that exceeded the AQS annual mean objective in 2014, this is in line with previous year's results. In comparison to concentrations recorded in 2013, all of the sites showed a decrease in concentration.

Table 2.5: Results of Nitrogen Dioxide Diffusion Tubes in 2014

Site ID	Location	Site Type*	Within AQMA?	Triplicate or Collocated Tube	Full Calendar Year Data Capture 2014 (Number of Months)	Confirm if data has been distance corrected (Y/N)	2014 Annual Mean Concentration (μg/m^3) -Bias Adjustment factor = 1.00
SH 1	21 Millfield Gardens	UB	N	N	11	N	13.1
SH 2	Nutten Stoven	UB	N	N	12	N	12.2
SH 3	Priory Road	UB	N	N	12	N	18.9
SH 4	46 The Hollies	UB	N	N	12	N	12.2
SH 5	Station Road	R	N	N	12	N	16.2
SH 6	103 Boston Road	NR	N	N	12	N	22.8
SH 7	Field End	R	N	N	12	N	19.1
SH8/9/10	Westmere	UB	N	Triplicate and Co-located	12	N	12.1
SH 11	Metalair Site	R	N	N	12	N	20.8
SH 13	Pinchbeck Road	K	N	N	12	N	30.1
SH 14	Springfields Roundabout	K	N	N	12	N	25.4
SH 15	Church Street, Pinchbeck	R	N	N	12	N	28.3
SH 16	Bicker Road, Donington	NR	N	N	11	N	14.3
SH 17	High Road, Spalding	R	N	N	12	N	28.2
SH 18	Hawthorn Bank, Spalding	R	N	N	12	N	24.1

* K – Kerbside, NR – Near-Road, R – Roadside, UB – Urban Background

Table 2.6: Results of Nitrogen Dioxide Diffusion Tubes (2008 to 2014)

Site ID	Site Type*	Within AQMA?	Annual Mean Concentration (adjusted for bias) $\mu g/m^3$						
			2008 (Bias Adjustment Factor = 1.13)	2009 (Bias Adjustment Factor = 1.33)	2010 (Bias Adjustment Factor = 0.99)	2011 (Bias Adjustment Factor = 1.28)	2012 (Bias Adjustment Factor =1.01)	2013 (Bias Adjustment Factor = 1.08)	2014 (Bias Adjustment Factor = 1.00)
SH 1	UB	N	18.2	20.3	15.6	17.0	13.8	14.9	13.1
SH 2	UB	N	17.4	18.1	16.3	16.7	13.9	15.0	12.2
SH 3	UB	N	23	24.8	21.2	22.8	17.6	19.4	18.9
SH 4	UB	N	18.7	18.9	16.3	16.2	13.9	13.9	12.2
SH 5	R	N	24.3	24.8	19.7	22.6	17.4	17.9	16.2
SH 6	NR	N	27.3	27.4	27.6	28.5	22.5	25.4	22.8
SH 7	R	N	23.5	25.6	20.3	27.4	19.4	21.0	19.1
SH8/9/10	UB	N	16.2	18.2	14.3	16.0	12.6	13.5	12.1
SH 11	R	N	25.3	29.2	23.1	27.1	21.5	21.9	20.8
SH 13	K	N	30.8	**42.2**	33.5	36.4	26.9	32.3	30.1
SH 14	K	N	30.5	34.3	30.8	31.3	24.1	27.3	25.4
SH 15	R	N	-	-	30.0	36.4	27.2	31.6	28.3
SH 16	NR	N	-	-	13.7	21.5	14.7	16.1	14.3
SH 17	R	N	-	-	22.6	33.9	25.0	28.3	28.2
SH 18	R	N	-	-	24.6	32.3	25.4	25.4	24.1

Exceedences of the NO2 annual mean AQS objective are shown in **bold**.
* K – Kerbside, NR – Near-Road, R – Roadside, UB – Urban Background

Figure 2.9: Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites

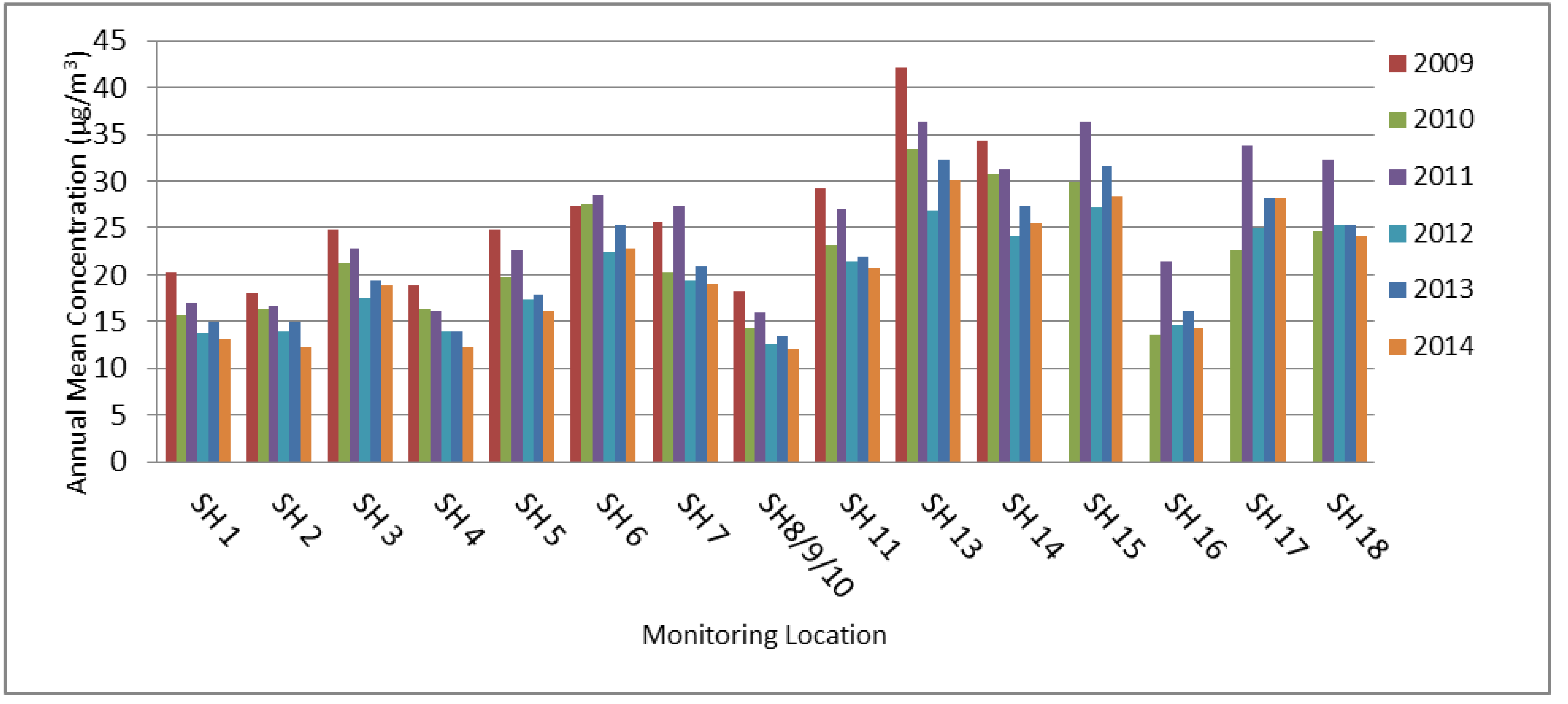


Figure 2.9 above shows the trend in NO_2 concentration for all diffusion tube monitoring sites located in South Holland District Council. Concentrations have decreased from 2013 to 2014 and at the majority of the monitoring sites the concentration levels are the lowest within the time period. There were no monitoring locations where the annual mean objective was exceeded in 2014.

2.2.2 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.

South Holland District Council undertook monitoring of PM_{10} using TEOM analysers at two locations during 2014; Spalding Monkhouse School, an urban background site and Westmere School, a rural site.

The PM_{10} monitoring data is presented in Table 2.7 and Table 2.8 below. Results for the TEOMs have been corrected using the Volatile Correction Model (VCM)[1]. Full details of the QA/QC procedure are provided in Appendix A: QA/QC Data.

Previous years PM_{10} data has been subjected to an internal QA audit since the last review and assessment report and it was found that certain data was not being corrected using the VCM therefore was presented inaccurately. All data from 2008 has now been checked, where inaccuracies have been found the data has been amended to now show as correct.

The 2014 PM_{10} results show that the annual mean and the 24-hour mean continue to meet the AQS objectives at both monitoring locations within the District. Both monitoring locations continue to show very similar concentrations of annual mean PM_{10} and since 2009 also show similar concentration trends.

Both monitoring locations show a decrease in annual mean concentration from 2008 to 2009 where both locations recorded their lowest annual mean concentration, before beginning an increasing trend that peaks in 2011 where the annual mean concentrations are at their highest value for both locations. Concentrations reduced from 2011 to 2012 before again increasing in 2013 but not to levels experienced in 2011. Both locations experienced a decrease in trend between 2013 and 2014.

[1] 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.

Table 2.7: Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

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)						
						2008	2009	2010	2011	2012	2013	2014
Spalding Monkhouse School	UB	N	98.6	98.6	Y	17.5	14.9	18.8	20.5	17.3	18.9	17.9
Westmere School	R	N	98.9	98.9	Y	15.8	15.7	18.8	19.7	16.0	17.9	17.2

* UB – Urban Background, R – Rural

Figure 2.10: Trends in Annual Mean PM_{10} Concentrations

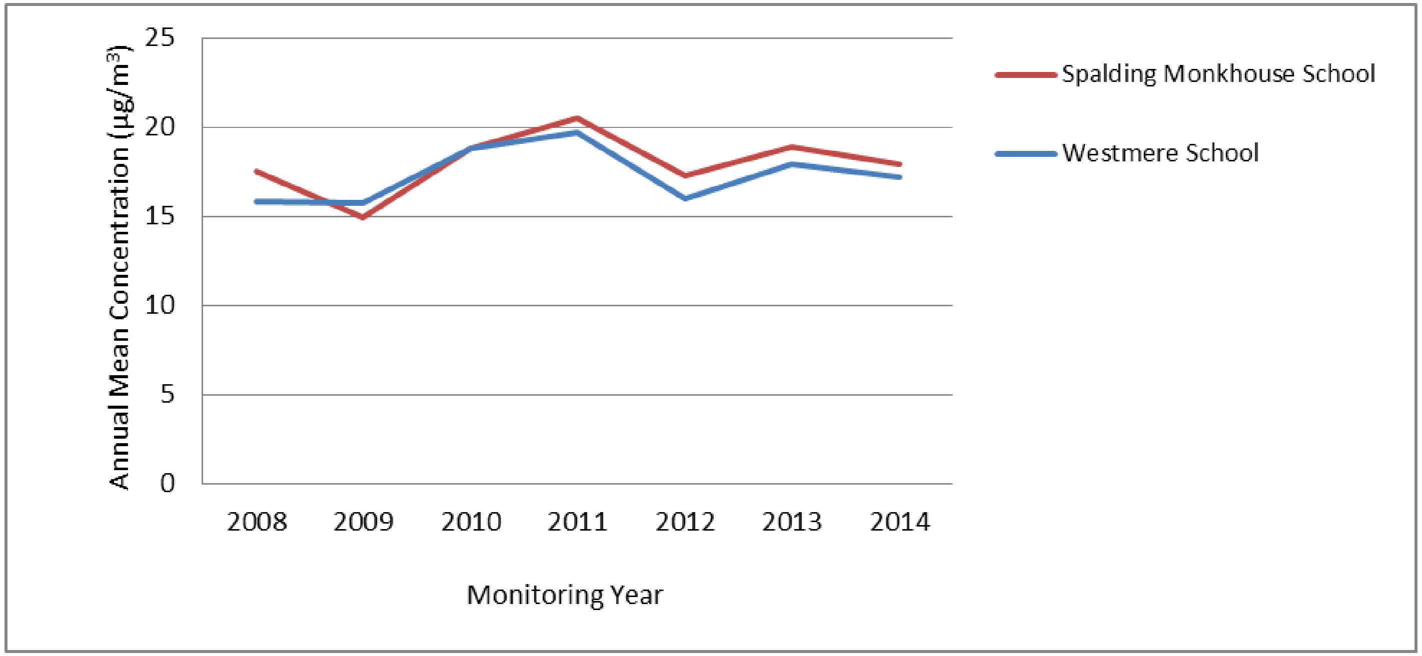


Table 2.8: Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

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 (µg/m³)						
						2008	2009	2010	2011	2012	2013	2014
Spalding Monkhouse School	UB	N	98.6	98.6	Y	5	1 (22.7)	0	7	2	5	4
Westmere School	R	N	98.9	98.9	Y	0	0	0 (28.7)	8	2	4 (27.6)	4

* UB – Urban Background, R – Rural

Note - If data capture is less than 90%, the 90th percentile of 24-hour means has been included in brackets

2.2.3 Sulphur Dioxide (SO_2)

There is currently no SO_2 monitoring undertaken by South Holland District Council.

2.2.4 Benzene (C_6H_6)

There is currently no Benzene (C_6H_6) monitoring undertaken by South Holland District Council.

2.2.5 Other pollutants monitored

In addition to monitoring NO_2 and PM_{10}, the automatic analyser located at Westmere School also monitors Ozone (O_3) concentration.

O_3 is a trans-boundary pollutant; its sources can be frequently spatially distant from the measured site of the concentration. This pollutant is not a prescribed air quality objective for the purposes or LAQM and therefore the results presented are for information only.

The AQS objective for ground level O_3 (to be met by 2005) states that the maximum daily concentration (measured as an 8-hour running mean) of 100 µg/m^3 should not be exceeded more than 10 times per year. The results from 2014 show that the AQS objective was not exceeded.

Table 2.9: Results of Westmere School Automatic Ozone Monitoring

Location	Within AQMA?	2014 Data Capture %	Number of Exceedences of Maximum Daily Concentration (8-hour running mean)		
			2012	2013	2014
Westmere School	No	99.2	5*	55	8

Exceedence of the O_3 objective: 8-hour mean of 100 µg/m^3, 10 exceedences allowed per year.
* Previously reported as 7 exceedences, found to have been incorrectly calculated from internal QA audit.

2.2.6 Summary of Compliance with AQS Objectives

South Holland District Council has examined the results from monitoring in the district. Concentrations are all below the objectives, 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 throughout the day; and
- A narrow street is one with residential properties within 2m of the kerb and has buildings on both sides of the road.

No roads have been identified within South Holland District Council as meeting this requirement.

South Holland 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.

South Holland 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 of HGV's would be one where the proportion of these vehicles would be greater than 20%.

South Holland 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 will 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 Holland 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

South Holland District Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

South Holland District Council confirmed that there have been no roads with traffic flows greater than 10,000 vehicles per day that have experienced an increase in traffic flow of more than 25%.

South Holland 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_2 and PM_{10} emissions at bus stations that are not enclosed with >2500 movements per day.

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

4 Other Transport Sources

4.1 Airports

South Holland 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_2 emissions, while the assessment for moving diesel trains considers NO_2 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 Holland 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 Holland.

South Holland 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 take place and there is exposure within 250m, or where there are over 15,000 movements per year and exposure within 1km.

South Holland 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

The assessment of industrial installations considers all of the regulated pollutants, although those most at risk of requiring further work are SO_2, NO_2, PM_{10} and Benzene.

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

Planning permission has been granted and a Pollution Prevention and Control Permit issued for a new Crematorium on the land at Gosberton Road, Spalding. This source was screened in the last round of Review and Assessment and therefore has not been assessed within the USA.

South Holland 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 Holland 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

South Holland 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.

5.2 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 requiring 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; and
- A busy road nearby, one with more than 30,000 vehicles per day.

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

5.4 Poultry Farms

Studies have been conducted by the Environmental Agency, Department for Environmental Northern Ireland and a Local Authority. From the studies the following guidance has been produced as to assessment of poultry farms:

- 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 Holland District Council confirms that poultry farms meeting the specified criteria have already been assessed through a detailed assessment. As such there is no need to complete a further detailed assessment at this stage.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

South Holland District Council have identified the following biomass installations which have not have previously been assessed within Review and Assessment and are over 50kW in power output.

<u>Bernard Matthews Applications</u>

- **Erection of 8 biomass heating packaged plant rooms (Ref. H19-0595-13)**

  Approved on 10/09/13
  Gedney Hill Farm
  Luttongate Road, Gedney Hill
  Spalding, PE12 0QH

- **Erection of 9 biomass heating packaged plant rooms (Ref. H01-0591-13)**

  Approved 10/09/13
  Paradise Farm
  Mill Drove North, Cowbit
  Spalding, PE12 6AS

- **Siting of 8 biomass heating packaged plant rooms and associated works (Ref. H09-0135-14)**

  Approved 07/04/14
  Holbeach Farm
  East Side of New River Gate
  Holbeach St John
  Spalding, PE12 0RY

- **Siting of 10 biomass heating packaged plant rooms and associated works (Ref. H19-0163-14)**

  Approved 07/04/14
  Luttongate Farm
  West side of Luttongate Road
  Sutton St Edmund
  Spalding, PE12 0LJ

- **Installation of four packaged biomass plant room and fuel stores (Ref. H03-0098-14)**

  Approved 20/05/14

  South Drove

  Spalding, PE11 3ED

- **Installation of four packaged biomass plant room and fuel stores (Ref. H08-0099-14)**

  Approved 22/05/14

  Broad Drove

  Gosberton Clough

  Spalding, PE11 4JS

- **Erection of 8 biomass heating packaged plant rooms (Ref. H19-0250-14)**

  Approved 29/05/14

  200 Luttongate Road

  Sutton St Edmund

  Spalding, PE12 0LJ

- **10 biomass heating packaged plant rooms (Ref. H14-0933-14)**

  Approved 15/12/14

  Pinchbeck Farm

  Cowards Lane, Pinchbeck

  Spalding, PE11 3SP

<u>Other Applications</u>

- **Redford Flowers Ltd (Ref. H16-0866-13)**

Installation of biomass boiler, including energy cabin, fuel store, accumulator tank and pumps and controls

  Approved 02/12/13

  Sycamore Farm, Holbeach Road

  Spalding, PE12 6JP

- **Bridge Farm Nurseries Ltd (Ref. H16-0286-14)**

Erection of biomass plant

  Application Undecided

  Bridge Farm, Horseshoe Road

Spalding, PE11 3BE

- **Millview Nurseries (Ref. H14-0601-14)**

Installation of a biomass boiler

Approved 04/09/14

Millview Nursery

Fengate Road, West Pinchbeck

Spalding, PE11 3NE

- **George Barnsdale and Sons Ltd (Ref. H04-0664-14)**

Installation of biomass boiler and feed hopper

Approved 21/10/14

24 High Street, Donington

Spalding, PE11 4TA

- **T & D Ball (Ref. H16-0274-14)**

Erection of new glasshouse incorporating a biomass boiler, storage tanks, drainage grip and earth bund

Approved 21/10/14

Horseshoe Nursery, Horseshoe Road

Spalding, PE11 3JB

- **Lucksbridge Horticulture Ltd (Ref. H22-0908-14)**

Proposed new glasshouses and 2 new biomass plant rooms

Approved 23/03/15

Lucksbridge Nurseries

Broadgate Drove, Moultan Chapel

Spalding, PE12 0UX

- **J T Peach and Sons (Ref. H14-0973-14)**

New flue for biomass boiler

Approved 23/01/15

Pear Tree Farm

Glenside South, West Pinchbeck

Spalding, PE11 3NH

- **JVG Herbs Ltd (Ref. H14-1071-14)**

Creation of new herb growing facility with biomass heating

Approved 26/03/15

Bridge Farm

Horseshoe Road, Pode Hole

Spalding, PE11 3BE

- **Country Herbs and Plants Ltd (Ref. H16-0092-15)**

Installation of 1 container housing biomass boiler

Approved 13/03/15

Ventura Nursery

Horseshoe Road, Pode Hole

Spalding, PE11 3BE

- **Ruthkay Ltd (Ref. H02-0026-15)**

Fenland Tourism Centre with on-site bio-fuel boiler

Approved 26/03/15

Off Carrington Drove

Crowland

PE6 0BZ

Of the above installations full emission data is available for the applications of Redford Flowers Ltd and J T Peach and Sons only. As yet there is no monitoring data available and an air quality assessment has not been undertaken as part of the planning application for either installation. Therefore, the installations have been screened using the Biomass Calculator Tool[2] available on the LAQM website. The outputs of the calculator are presented in Appendix C: LAQM Biomass Calculator Output and the data below has been used as the input parameters.

Table 6.1: Redford Flowers Ltd Biomass Data

Required Parameter	Input
Building Height (Tallest building within 5 x stack height)	6.5m
Stack Diameter	0.55m
Stack Height	9.5m
PM_{10} Annual Mean Background (µg/m^3)	19.23
NO_2 Annual Mean Background (µg/m^3)	12.04
Target Emission Rate PM_{10} (g/s)	0.0363
Target Emission Rate Annual NO_2 (g/s)	0.2355
Target Emission Rate Hourly NO_2 (g/s)	0.137

The emission rates for Redford Flowers Ltd are 0.019 g/s for total particulates and 0.092 g/s for NO_x. The emission rates are below the target emission rates for both PM_{10} and NO_x given by the biomass calculator.

[2] Biomass Calculator Tool 6, an Excel spreadsheet reproduction of the graphs published in Defra TG (09)

Table 6.2: J T Peach and Sons Biomass Data

Required Parameter	Input
Building Height (Tallest building within 5 x stack height)	5.8m
Stack Diameter	0.3m
Stack Height	7.0m
PM_{10} Annual Mean Background (µg/m^3)	18.35
NO_2 Annual Mean Background (µg/m^3)	9.79
Target Emission Rate PM_{10} (g/s)	0.0139
Target Emission Rate Annual NO_2 (g/s)	0.0908
Target Emission Rate Hourly NO_2 (g/s)	0.0471

The emission rates For J T Peach and Sons are 0.0064 g/s for total particulates and 0.098 g/s for NO_x. The emission rates are below the target emission rates for both PM_{10} and NO_x given by the biomass calculator.

It is therefore considered unlikely that either installation will result in any exceedences of the AQS objectives at any relevant receptor location.

All other installations will be taken into consideration within the Review and Assessment procedure when full emission data becomes available.

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

It is noted that for a number of biomass installations full emission data was not available for screening consideration, South Holland District Council will consider these installations within Review and Assessment when full emission data is available.

6.2 Biomass Combustion – Combined Impacts

South Holland 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_2 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_{10} from domestic solid fuel burning is covered under the biomass combustion – combined impacts section above.

South Holland 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_{10} 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 previous rounds of review and assessment, or where there is new relevant exposure, require consideration. In the case of proposed new sources, these are only required to be considered if planning approval has been granted.

South Holland 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 2014 monitoring data from the District has identified no exceedences of the AQS objectives at any of South Holland District Council's automatic or non-automatic monitoring sites. This is in line with previous years monitoring data.

Results from diffusion tube sites showed that NO_2 concentrations in 2014 decreased at all monitoring locations in comparison to 2013.

Continuous monitoring results for 2014 indicate that both the annual mean objective and the 1-hour AQS objectives for NO_2 were met at both monitoring locations. Spalding Monkhouse School has shown a decrease in annual mean concentration from 2012, whereas Westmere School has shown a decrease in annual mean concentration from 2010.

The 2014 results for PM_{10} monitoring show that both the annual mean and 24-hour mean AQS objectives continue to be met at both automatic monitoring locations within the District. Both sites continue to show very similar concentrations and trends of annual mean PM_{10}, a decrease in annual mean concentration was experienced at both sites between 2013 and 2014.

Based on the results of monitoring completed in 2014 there is no requirement to proceed to a Detailed Assessment at any monitoring location.

8.2 Conclusions from Assessment of Sources

South Holland District Council has identified a number of applications for biomass boilers which may have the potential to impact the air quality within the District. For a number of the installations the required emissions data is not available to complete a screening assessment of the installations. This will be completed within Review and Assessment when the required emissions data becomes available.

Emissions data is available for two biomass boiler applications; Redford Flowers Ltd and J T Peach and Sons. Screening has been completed for both installations using the Biomass Calculator Tool. In both cases the emissions rates of the installations for both PM_{10} and NO_2 annual mean were below the target emission rates from the Biomass Calculator therefore a Detailed Assessment was not required.

8.3 Proposed Actions

Proposed actions arising from the 2015 Updating and Screening Assessment are as follows:

- Continue automatic monitoring of PM_{10}, NO_2 and O_3 within the District to identify future changes in pollutant concentrations;
- Continue non-automatic monitoring of NO_2 using diffusion tubes to identify future changes in pollutant concentrations;
- Continue to gather emission and stack information for the identified biomass installations to determine their individual and cumulative impact upon air quality within the District; 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 Factor 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
- Biomass Calculator Tool, available at http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html#biomass
- South Holland District Council 2012 Updating and Screening Assessment
- South Holland District Council 2013 Annual Progress Report
- South Holland District Council 2014 Annual Progress Report

Appendices

Appendix A: QA/QC Data

Appendix B: NO2 Diffusion Tube Monthly Data

Appendix C: LAQM Biomass Calculator Output

Appendix A: QA/QC Data

Factor from Local Co-location Studies

There is a co-located triplicate diffusion tube monitoring site (SH 8/9/10) installed at the urban background Westmere School automatic monitoring site. The local bias correction factor is presented below in Table A1 and an output from the National Diffusion Tube Bias Adjustment Factor Spreadsheet (v.03_15) is given in Figure A1.

Table A1: Local Bias Correction Factor

Location	Diffusion Tube Data Capture	Continuous Monitor Data Capture	Diffusion Tube Annual Mean	Continuous Monitor Annual Mean	Ratio
Westmere (Sh 8/9/10)	100%	99.60%	12.11 μg/m^3	12.11 μg/m^3	1.00

Figure A1: Local Bias Correction Factor Output

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
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	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	09/01/2014	04/02/2014	21.4	21.8	19.6	21	1.2	6	2.9	17.01	99.36	Good	Good
2	04/02/2014	05/03/2014	15.0	15.2	14.8	15	0.2	1	0.5	12.98	99.86	Good	Good
3	05/03/2014	01/04/2014	12.4	12.9	14.0	13	0.8	6	1.9	14.64	100	Good	Good
4	01/04/2014	28/04/2014	9.8	11.8	9.9	11	1.2	11	2.9	15.43	100	Good	Good
5	28/04/2014	28/05/2014	8.5	8.2	9.4	9	0.6	7	1.5	10.97	100	Good	Good
6	28/05/2014	30/06/2014	6.4	6.0	6.2	6	0.2	3	0.5	7.26	99.75	Good	Good
7	30/06/2014	28/07/2014	5.9	5.7	5.8	6	0.1	2	0.3	5.56	100	Good	Good
8	28/07/2014	28/08/2014	7.6	7.4	8.1	8	0.4	5	0.9	6.34	100	Good	Good
9	28/08/2014	02/10/2014	7.6	7.8	7.7	8	0.1	1	0.2	7.58	98.81	Good	Good
10	02/10/2014	29/10/2014	11.2	12.3	13.2	12	1.0	8	2.4	14.17	99.54	Good	Good
11	29/10/2014	04/12/2014	23.2	20.8	22.2	22	1.2	6	3.1	17.90	98.96	Good	Good
12	04/12/2014	09/01/2015	16.6	15.6	14.4	15	1.1	7	2.7	16.07	99.07	Good	Good
13													
										Overall survey -->		Good precision	Good Overall

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

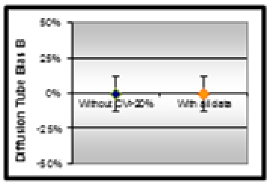
Site Name/ ID:

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A 1 (0.9 - 1.14)
Bias B 0% (-12% - 11%)
Diffusion Tubes Mean: 12 μgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 12 μgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 12 (11 - 14) μgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 1 (0.9 - 1.14)
Bias B 0% (-12% - 11%)
Diffusion Tubes Mean: 12 μgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 12 μgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 12 (11 - 14) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Diffusion Tube Bias Adjustment Factors

The diffusion tubes are supplied and analysed by Gradko International Limited utilising the 50% Triethanolamine (TEA) in acetone preparation method. The bias adjustment factor for 2014 is 0.97 (based on 9 studies, version 03_15) as obtained from the national bias adjustment calculator.

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[3] recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

The local bias adjustment factor is 1.00. The triplicate monitoring sites had 100% data capture in 2014 with good precision throughout. Local bias adjustment was also used in the previous round of review and assessment, therefore, it was decided to use the local bias adjustment for the 2014 data. For comparison, the national bias adjustment factor for the laboratory for 2014 was 0.97 based on 9 studies, taken from the National Bias Adjustment Calculator[4].

For the data from the previous year's 2008-2013, the bias adjustment factors have been taken from the Council's previous LAQM reports. The factors used were 1.13 (2008), 1.33 (2009), 0.99 (2010), 1.28 (2011), 1.01 (2012) and 1.08 (2013).

PM Monitoring Adjustment

The PM_{10} results have been gravimetrically corrected by Ricardo-AEA who undertake the data management for the two automatic continuous monitoring sites.

Short-term to Long-term Data Adjustment

All monitoring locations recorded data capture of >75%, therefore it was not required to annualise any monitoring data.

[3] Laqm.defra.gov.uk
[4] National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/15 published in March 2015.

QA/QC of Automatic Monitoring

South Holland District Council contracts data management for their continuous analysers to Ricardo-AEA. The Quality Assurance/Quality Control (AQ/QC) procedures employed by Ricardo-AEA are equivalent to the UK Automatic Urban and Rural Network (AURN) procedures.

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[5], 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 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.

[5] 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

Appendix B: NO_2 Diffusion Tube Monthly Data

Table B1: NO_2 Diffusion Tube Monthly Data

Site Ref	NO_2 Concentrations (µg/m³)												Count	Average (µg/m³)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
SH1	19.84	15.82	15.00	11.21	9.07	x	7.21	6.95	9.48	12.44	22.42	14.98	11	13.13
SH2	15.37	12.32	15.78	10.69	9.02	9.73	8.34	8.20	11.89	10.47	21.71	12.77	12	12.19
SH3	24.35	20.01	23.39	17.11	15.09	14.53	12.90	13.59	17.63	17.10	28.14	22.48	12	18.86
SH4	17.38	13.45	14.89	10.31	8.68	7.89	7.39	7.34	9.63	11.72	21.52	16.47	12	12.22
SH5	19.13	15.15	20.17	12.82	14.31	11.81	14.73	14.06	15.25	16.85	20.90	19.17	12	16.20
SH6	22.37	16.25	26.89	22.12	22.23	23.77	25.20	16.93	29.18	16.28	30.60	21.39	12	22.77
SH7	31.35	20.88	23.71	16.82	16.68	14.42	11.85	17.11	14.12	23.15	17.54	21.78	12	19.12
SH8	21.41	15.03	12.43	9.75	8.50	6.37	5.94	7.61	7.62	11.19	23.21	16.55	12	12.13
SH9	21.78	15.17	12.86	11.83	8.19	5.96	5.74	7.36	7.76	12.29	20.75	15.55	12	12.10
SH10	19.59	14.78	13.95	9.93	9.39	6.16	5.81	8.08	7.73	13.15	22.18	14.35	12	12.09
SH11	27.46	19.27	25.75	18.85	21.37	17.82	17.51	15.31	19.27	20.79	28.17	17.63	12	20.77
SH13	39.17	32.32	30.56	29.07	29.18	22.56	23.16	26.03	27.38	28.00	38.05	36.14	12	30.13
SH14	27.78	26.01	25.89	27.59	22.75	25.36	21.36	21.45	x	21.06	35.09	25.22	11	25.42
SH15	31.06	25.23	28.40	24.88	28.10	25.55	27.31	23.57	31.69	29.70	36.47	27.92	12	28.32
SH16	20.90	15.88	16.17	12.14	12.05	9.49	9.71	9.18	10.94	13.80	22.80	18.75	12	14.32
SH17	43.36	29.63	33.61	28.06	x	22.51	20.70	17.88	22.88	25.72	39.55	26.39	11	28.21
SH18	27.95	22.23	27.25	22.35	22.34	18.89	20.71	24.90	21.63	23.36	28.79	29.11	12	24.12

Appendix C: LAQM Biomass Calculator Output

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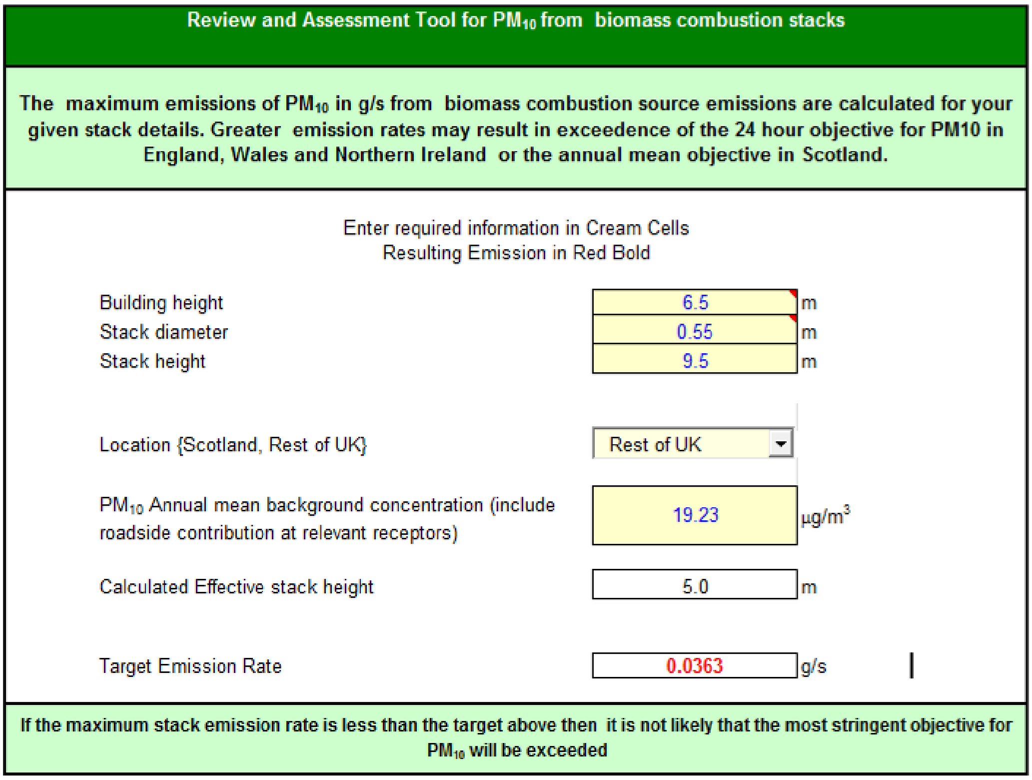
Figure C1: PM_{10} Annual Target Emission Rate Output



Review and Assessment Tool for PM_{10} from biomass combustion stacks

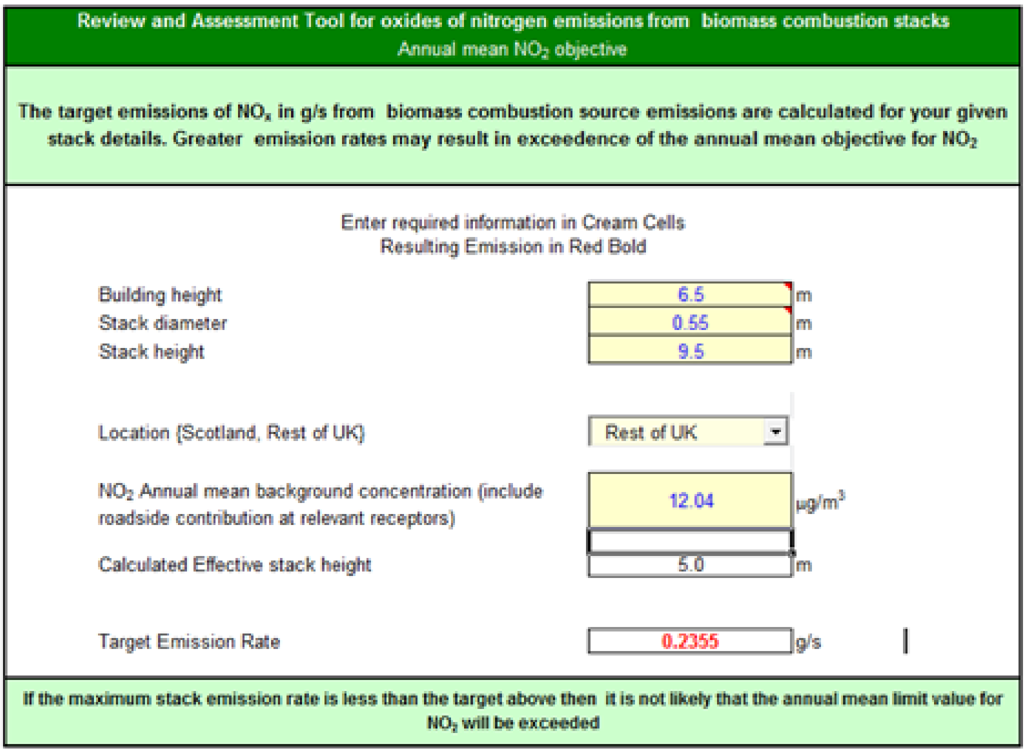
The maximum emissions of PM_{10} in g/s from biomass combustion source emissions are calculated for your given stack details. Greater emission rates may result in exceedence of the 24 hour objective for PM10 in England, Wales and Northern Ireland or the annual mean objective in Scotland.

Enter required information in Cream Cells
Resulting Emission in Red Bold

Building height	6.5	m
Stack diameter	0.55	m
Stack height	9.5	m
Location {Scotland, Rest of UK}	Rest of UK	
PM_{10} Annual mean background concentration (include roadside contribution at relevant receptors)	19.23	$\mu g/m^3$
Calculated Effective stack height	5.0	m
Target Emission Rate	**0.0363**	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_{10} will be exceeded

Figure C2: NO_x Annual Target Emission Rate Output



Review and Assessment Tool for oxides of nitrogen emissions from biomass combustion stacks
Annual mean NO_2 objective

The target emissions of NO_x 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_2

Enter required information in Cream Cells
Resulting Emission in Red Bold

Building height	6.5	m
Stack diameter	0.55	m
Stack height	9.5	m
Location {Scotland, Rest of UK}	Rest of UK	
NO_2 Annual mean background concentration (include roadside contribution at relevant receptors)	12.04	$\mu g/m^3$
Calculated Effective stack height	5.0	m
Target Emission Rate	**0.2355**	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_2 will be exceeded

Figure C3: NO_x Hourly Target Emission Rate Output

Review and Assessment Tool for oxides of nitrogen emissions from biomass combustion stacks
Hourly mean NO_2 objective

The target emissions of NO_x 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_2

Enter required information in Cream Cells
Resulting Emission in Red Bold

Building height	6.5	m
Stack diameter	0.55	m
Stack height	9.5	m
Location {Scotland, Rest of UK}	Rest of UK	
NO_2 Annual mean background concentration (include roadside contribution at relevant receptors)	12.04	µg/m^3
Calculated Effective stack height	5.0	m
Target Emission Rate	**0.137**	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_2 will be exceeded

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Figure C4: PM_{10} Annual Target Emission Rate Output

Review and Assessment Tool for PM_{10} from biomass combustion stacks

The maximum emissions of PM_{10} 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	5.8	m
Stack diameter	0.3	m
Stack height	7	m
Location {Scotland, Rest of UK}	Rest of UK	
PM_{10} Annual mean background concentration (include roadside contribution at relevant receptors)	18.35	µg/m^3
Calculated Effective stack height	2.0	m
Target Emission Rate	**0.0139**	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_{10} will be exceeded

Figure C5: NO_x Annual Target Emission Rate Output

Review and Assessment Tool for oxides of nitrogen emissions from biomass combustion stacks

Annual mean NO_2 objective

The target emissions of NO_x 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_2

Enter required information in Cream Cells
Resulting Emission in Red Bold

Building height	5.8	m
Stack diameter	0.3	m
Stack height	7	m
Location {Scotland, Rest of UK}	Rest of UK	
NO_2 Annual mean background concentration (include roadside contribution at relevant receptors)	9.79	µg/m^3
Calculated Effective stack height	2.0	m
Target Emission Rate	**0.0908**	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_2 will be exceeded

Figure C6: NO_x Annual Target Emission Rate Output

Review and Assessment Tool for oxides of nitrogen emissions from biomass combustion stacks

Hourly mean NO_2 objective

The target emissions of NO_x 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_2

Enter required information in Cream Cells
Resulting Emission in Red Bold

Building height	5.8	m
Stack diameter	0.3	m
Stack height	7	m
Location {Scotland, Rest of UK}	Rest of UK	
NO_2 Annual mean background concentration (include roadside contribution at relevant receptors)	9.79	µg/m^3
Calculated Effective stack height	2.0	m
Target Emission Rate	**0.0471**	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_2 will be exceeded