Biogen Westwood G2G
Air Dispersion Modelling Report

December 2025

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Version 1: December 2025

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Section1:

1.1 Purpose of Study

The primary objective of this study is to evaluate the potential impact of emissions to air from the new Gas to Grid (G2G) odour control units (OCUs) and Boiler plant operations on the surrounding area.

1.2 Site Description

The Westwood AD Plant is located on Bedford Road, Rushden, Northamptonshire, NN10 0SQ. The site lies predominantly in an agricultural setting. The main town centre of Rushden lies some 4.75 km to the northwest of the site and the nearest village of Souldrop lies 1.5km to the south-southwest. The site is centred on national grid reference SP98910 63213 (What3words – hovered.thumbnail.betrayed) and is accessed off Bedford Road. Westwood AD site is currently designed to accept and treat less than 65,000 tonnes per annum of waste food through its anaerobic digestion process. Following the G2G upgrade works, the permitted tonnage will increase to less than 110,000 tonnes per annum. The location of the site and the surrounding area land use can be seen in Section 1.5.

1.3 Sources of Emissions

There are several activities and processes occurring on the site that have the potential to produce odour. Details of these processes are covered in the Odour Management Plan (OMP) under the Processes & Emissions section (see Appendix 1). As part of the sites Gas to Grid extension works, two Odour Control Units and two new boilers will be installed. The new odour control units will replace existing plant currently under Emissions Points A5 & A6 in the site permit (Permit Ref: FP3137GF). Emissions Point A5 covers the extraction & treatment of the air from the Waste Reception Hall and A6 covers the extraction & treatment from Storage Tank No.1 headspace and will also include extraction from the Borger process when the new plant is installed. This report assesses the air dispersion results associated with the two new OCU's and two new boilers.

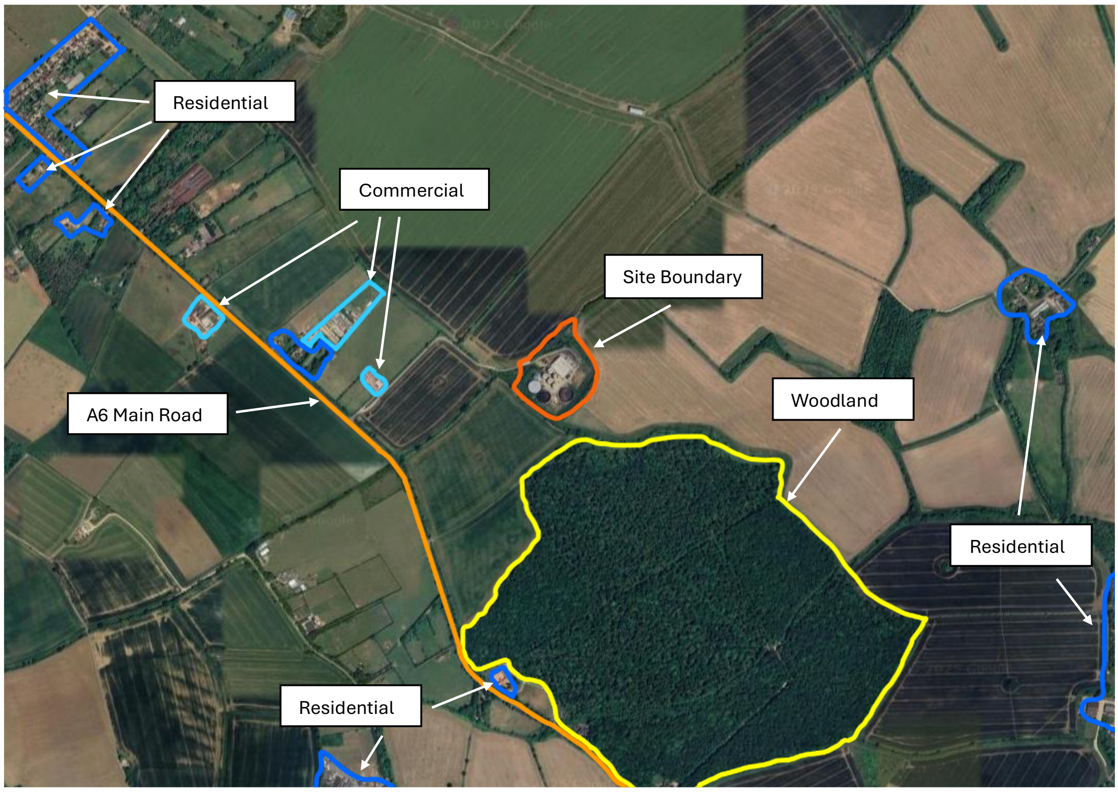
1.4 Modelled Emissions Points

The following emissions points are included in this study:

- New Waste Reception Hall Odour Control Unit (Emissions Point A5 in current site permit).
- New Storage Tank No.1 Headspace Air & Borger Extract Odour Control Unit (Emissions Point A6 in current site permit).
- Two new biogas fuelled 1.5 MW boilers (No included in current permit).

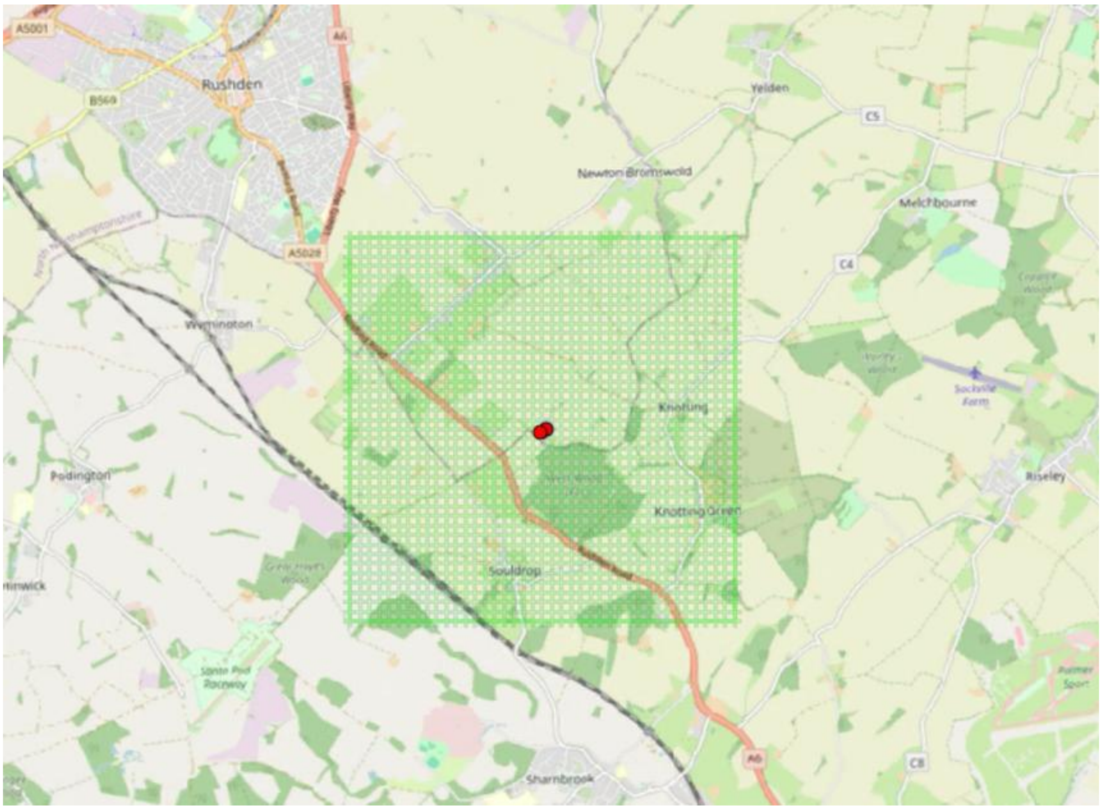
1.5 Site Maps

1.5.1 Site Boundary and Surrounding Area Land Use Map



Areas without demarcation are classified as agriculture land.

1.5.2 Gridded Modelled Area & Point Source Map



Section 2:

2.1 Emissions & Environmental Standards

2.1.1 Legislation

The Environmental Protection Act (EPA) 19901 provides a lawful basis for the control of pollution arising from industrial and other processes. Part III of the act defines a statutory nuisance as

"…any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance".

The act subsequently assigns the local authority the responsibility of detecting any statutory nuisances within its domain. Where a statutory nuisance exists or is likely to occur or reoccur, the local authority shall serve and abatement notice, which requires those responsible to mitigate or terminate processes, within a defined timescale. Failure to resolve a statutory nuisance can result in legal action and penalties. Local authorities can issue fines and individuals affected by the odour can seek compensation or injunctions privately.

In support of the EPA, the Environmental Permitting (England and Wales) Regulations 20162, provide a structure for regulating industrial activities and pollution therein, including odour. In the context of odour, a site's permit may require use of best available techniques (BAT) and/or odour management plans to minimise odour.

2.1.2 National Guidance

The Environmental Permitting Regulations require the control of pollution, including odour, from permitted industrial facilities. Where potential odour effects from a permitted process have been identified, The Environment Agency refers to the Horizontal Guidance Note IPPC H4 ("H4") for odour assessment and management6, which specifically discusses the concept of odour nuisance, monitoring, and control.

In 2010 Defra issued 'Odour Guidance for Local Authorities', which reiterated and revised some of the terminology and concepts introduced in pre-existing guidance, such as the Horizontal Guidance Note IPPC H4. The 2010 Defra guidance was designed for use by local authorities in situations where a business results in a potential nuisance. The guidance was withdrawn in 2017, but a replacement has not been issued.

2.1.2 National Planning Policy

Paragraph 180 of the National Planning Policy Framework (NPPF) states that:

'Planning policies and decisions should contribute to and enhance the natural and local environment by: preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.'

Paragraph 192 of the National Planning Policy Framework (NPPF) states that:

'Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. (…) Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.'

2.2 Chemical Substances Modelled

2.2.1 Odour Control Units (Odour, Ammonia & Hydrogen Sulphide)

Institute of Air Quality Management guidance defines odour as a mixture of many chemicals which interact to produce a 'smell'. While odour-free air refers to air containing no odorous chemicals, fresh air is usually perceived as air containing no chemicals or contaminants that could be 'unpleasant'.
While odour is not strictly speaking an air pollutant, certain combinations of chemicals can affect the human olfactory response (perception followed by psychological appraisal) and cause a loss of amenity. Perception of an odour can be subjective to the individual whether it is found as acceptable, objectionable or offensive. Odours are ranked according to their relative offensiveness and exposure criteria are assigned to each category. The criteria reflect the assumption that less offensive odours will be tolerated more frequently and at a greater strength than more offensive odours. When assessing potential impact on ecological receptors, ammonia concentration is usually expressed in terms of micrograms of ammonia per metre cubed of air ($\mu gNH_3/m^3$) as an annual mean.

2.2.2 Biogas Boilers (Nitrogen Dioxide & Sulphur Dioxide)

The boilers will provide a back-up to the site's thermal energy requirements and are able to use the biogas produced on-site as a fuel. The main source of thermal energy for the plant processes will be provided by the existing CHP engines. The boilers will only generally be used in periods when the CHP's are unable to provide sufficient thermal energy (i.e. during planned engine maintenance or down-time). Given the fuel type to be utilised by the boilers (biogas), NO_2 and SO_2 emissions will be considered in this study.

2.3 Ambient & Background Levels

Due to the complex nature of odour, no background odour data currently exist for the modelling area and therefore it has not been included within the model.

For the boiler parameters (NO_2 & SO_2), background levels for the modelling period of 2020 – 2024 were taken from the Department of Environment Food & Rural Affairs (DEFRA) UK Air Information Resource and are shown below:

Year	Background NO_2 Annual Mean (ug/m^3)	Background SO_2 Annual Mean (ug/m^3)
2020	5.86	0.90
2021	6.54	1.19
2022	7.92	1.51
2023	6.95	1.28
2024	7.61	0.87
Average:	**6.98**	**1.15**

Background levels are extrapolated from 5 km radius modelled data from the site location. Levels may vary markedly over relatively short distances and the UKAIR website itself notes that, the background values should be used only to assist the user in obtaining a broad indication of the likely pollutant impact at a specific location and cannot be considered representative of any particular location within the 5 km grid radius.

Section 3:

3.1 Modelling Information

Dispersion modelling for the Westwood site has been carried out using the Advance Dispersion Model Software (ADMS-6) dispersion model. The software uses the Gaussian plume modelling method and was supplied by Cambridge Environmental Research Consultant (CERC). Training for the Biogen operatives conducting the modelling was also provided by CERC via a two-day online course.
ADMS 6 is an advanced dispersion model used to model the air quality impact of existing and proposed industrial installations. It was originally developed for regulatory authorities in the UK. Its many features include allowance for the impacts of buildings, complex terrain, coastlines and variations in surface roughness; dry and wet deposition; NOx chemistry schemes; chemical reactions of amines released during carbon capture and storage (CCS); short term releases (puffs); calculation of fluctuations of concentration on short timescales, odours and condensed plume visibility; and allowance for radioactive decay including γ-ray dose.

Typical applications include:

- Assessment of modelled air pollution concentrations against air quality standards and limit values including those from WHO, EU, UK, USA and China.
- Planning/permitting, e.g. under Industrial Emissions Directive or Environmental Permitting Regulations.

- Stack height determination.
- Odour modelling.
- Environmental impact assessments and safety and emergency planning.

3.2 Emissions & Stack Data

Emissions and stack data are detailed in the table below. Locations of the stacks were taken from the engineering design drawings from the abatement manufacturer or from existing site drawings. OCU emission parameters were also provided by the abatement manufacturers and have been calculated based on the historic worst-case permit monitoring results for the site.

Unit	WRH OCU	ST1/Borger OCU	Boiler 1	Boiler 2
Fuel	-	-	Biogas	Biogas
Pollutant	Odour, Ammonia & H2S		NO_2 & SO_2	
NO_2 Model Value (mg/m^3)	-	-	150	150
SO_2 Model Value (mg/m^3)	-	-	100	100
Odour Model Value (ouE/m^3)	1000	1000	-	-
Ammonia Model Value (mg/m^3)	5	20	-	-
H_2S Model Value (mg/m^3)	0.1	0.1	-	-
Volumetric Flow Rate (m^3/s)	11.103	0.828	0.188	0.188
NO_2 Emissions Rate (g/s)	-	-	0.018	0.018
SO_2 Model Value (g/s)	-	-	0.012	0.012
Odour Model Value (ouE/s)	11103	828	-	-
Ammonia Model Value (g/s)	0.0555	0.0166	-	-
H2S Model Value (g/s)	0.0011	0.00008	-	-
Stack Height Above Ground (m)	12.793	4	8	8
Actual gas exit velocity (m/s)	11.27	13.44	1.5	1.5
Stack diameter (m)	1.12	0.28	0.4	0.4
Exit Temperature (°C)	Ambient	Ambient	150	150

3.3 Emission Reference Conditions

Odour emissions are referenced to 293°K, 101.3kPa, without correction for water vapour content. Oxygen levels on the outlets of both the abatement systems will be at ambient levels and therefore no oxygen correction value is required for the modelling. Boiler emissions have been referenced to stack conditions. NOx emissions resulting from the combustion process are comprised of both NO and NO_2. Once in the atmosphere, through complex reactions with ozone and sunlight, eventually most of NO is converted to NO_2. The Air Quality Standards used for this assessment are expressed as NO_2 (see Section 6.1.4 below). There are various approaches suggested by different agencies, however, for annual average it is commonly taken that full conversion takes place. i.e. all emitted NOx converts to NO_2. This approach is taken in this study.

Section 4:

4.1 Modelled Domain

Concentrations have been predicted across a nested 4.0 x 4.0 km Cartesian grid with a resolution of 100m. The receptor grid has been modelled at a height of 1.5 m above ground level.

4.2 Meteorological Data & Surface Characteristics

5 years of data was purchased from Enviro Data Services which provided historic data for the period 1st January 2020 – 31st December 2024. The model has been run with 5 complete years of data (2020 – 2024). The recommendation is at least 3 years.
Observed data from: Bedford Weather Station, Location 52.227, -0.464, Station Type: Automatic. Altitude: 85m above mean sea level.
Surface characteristics have been incorporated into the model using Terrain map data from the Ordnance Survey website.

Wind roses from the Bedford Weather Station for complete years 2020 – 2024 are shown in Figures 1 – 5:

Figure 1: Wind rose 2020 Meteorological Data

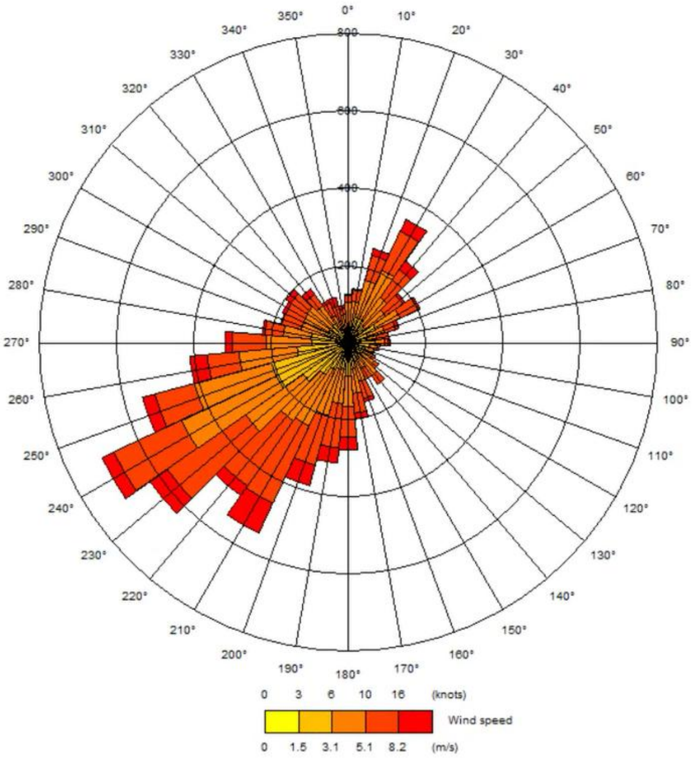


Figure 2: Wind rose 2021 Meteorological Data

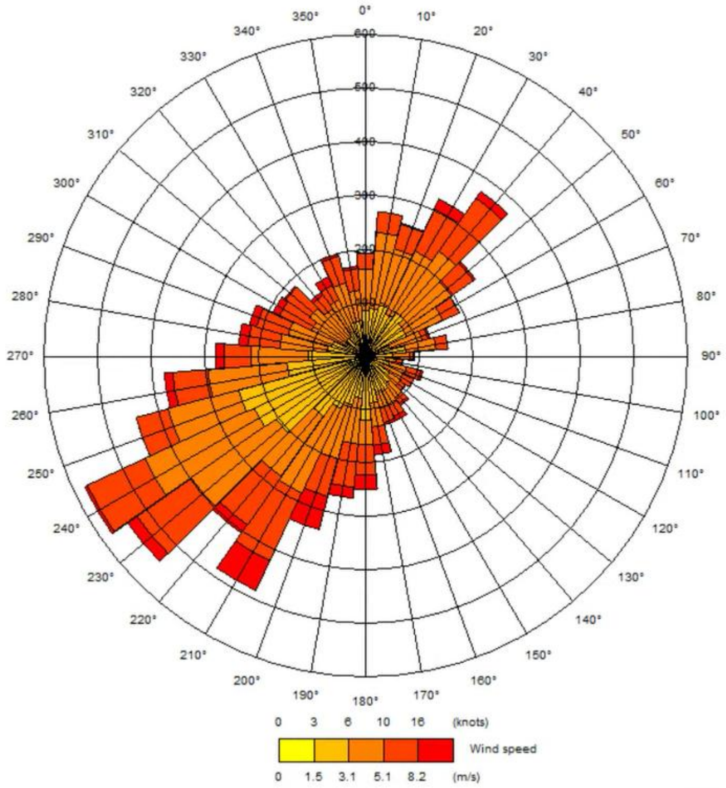


Figure 3: Wind rose 2022 Meteorological Data

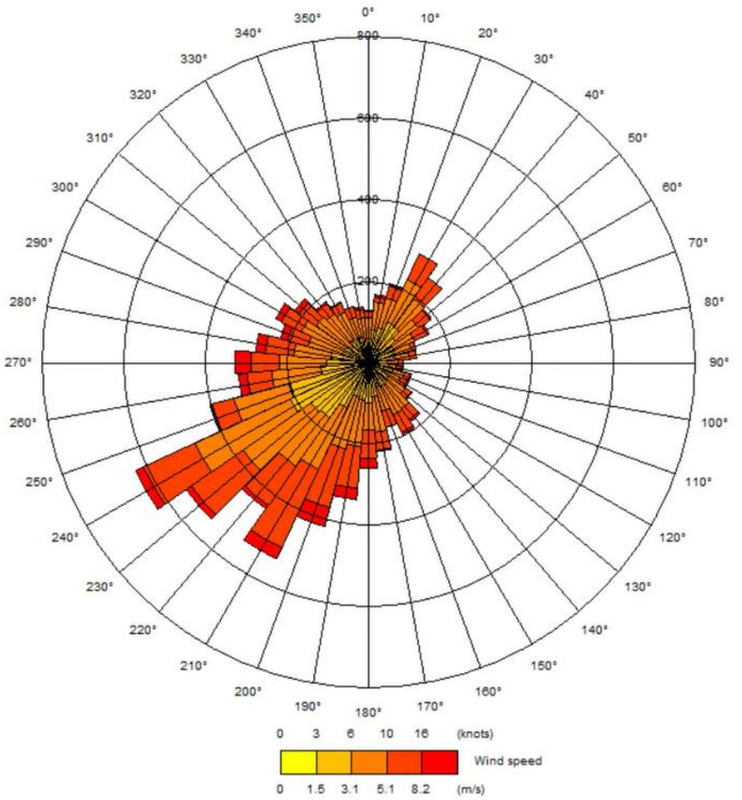


Figure 4: Wind rose 2023 Meteorological Data

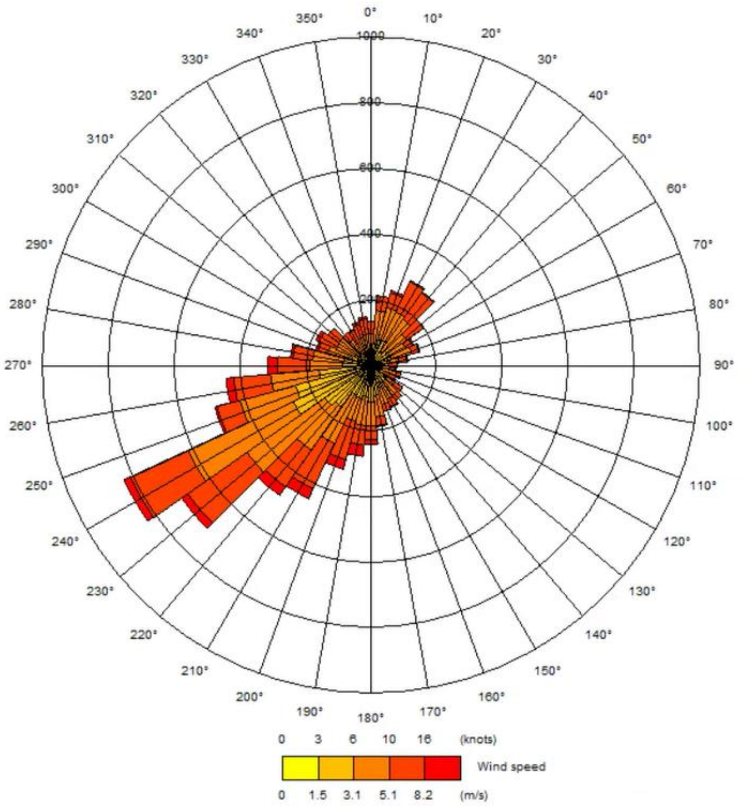
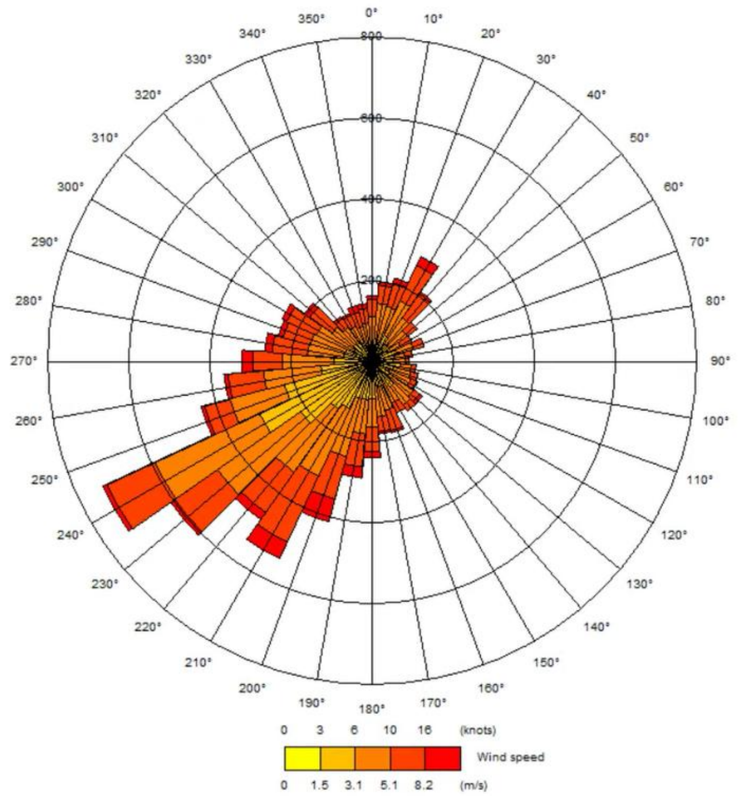


Figure 5: Wind rose 2024 Meteorological Data



4.3 Terrain & Building Information

Local terrain, based on OS Terrain 50 data, has been included within the model. The site is comprised of multiple structures – Waste Reception Hall, 5 Digester Tanks, 3 Storage Tanks, 2 Gas Holders (Gas Bags) and a Raw Waste Buffer Tank. The ADMS modelling software considers the 'main building' affects when calculating dispersion. Due to the various sized and shaped structures, the model was run in Automatic mode which selects the 'Main Building' used in the assessment based on the Point Source location and wind direction. Buildings used in the model either currently exist on site or will be constructed during the upgrading works (See Appendix 2 & 3).

Section 5:

5.1 Model Uncertainty

In the context of air dispersion modelling, such as with ADMS (Atmospheric Dispersion Modelling System), various factors that can introduce errors or variability into the model predictions. These uncertainties can arise from a variety of sources, including data inputs, model assumptions, and the limitations of the model itself. Below are the key categories of uncertainties involved in ADMS modelling:

- **Meteorological Data:** The quality and accuracy of the weather data used (wind speed, direction, temperature, humidity, etc.) are crucial. Meteorological data are often subject to spatial and temporal variability, which can lead to errors in predicting dispersion. Also, short-term weather fluctuations might not be captured by the data. ADMS relies on simplified assumptions about atmospheric stability, boundary layer structure, and turbulence. In reality, atmospheric conditions are highly variable and complex. These simplifications may not perfectly represent real-world scenarios, leading to uncertainties.
- **Source Data:** The emissions data (e.g., the rate, composition, and temperature of pollutants) can be uncertain due to measurement errors, assumptions in the estimation of emissions, or variability in emissions over time. These uncertainties are often a result of incorrect or incomplete source characterization. The model assumes a certain pattern of pollutant emission (e.g., Gaussian plume models), but actual emissions might not follow these idealized assumptions. Variability in stack height, emission velocity, and plume rise can lead to discrepancies between the model and observed concentrations. The model's calculation of plume rise is highly sensitive to the temperature, velocity, and characteristics of the emission. Errors in these inputs can lead to large discrepancies in dispersion predictions.
- **Terrain and Land Use Data:** Variations in terrain, surface roughness, and land use can impact the dispersion of pollutants. The precision of topographic and land-use data can vary, leading to uncertainties in how the model simulates pollutant transport.
- **Spatial Variability**: The dispersion of pollutants can vary significantly across a region, depending on local factors such as terrain, proximity to other sources, or urban structures. If the model does not capture sufficient spatial detail (e.g., in grid resolution), it may produce inaccurate results.

ADMS is a widely used and powerful tool for predicting air quality and pollutant dispersion, it is essential to recognize and account for these uncertainties when interpreting results, especially in regulatory or decision-making contexts.

5.2 Sensitivity Analysis

The output of the model can be highly sensitive to certain parameters and small changes in input data (like emission rates, wind speed, or stability classes) can lead to significant variations in the results. In modelling the projected dispersion from the Westwood site, the emissions rate is deemed as the main parameter that could lead to the highest variations in the results. In order to account for this, the emissions rates used in the model represents the worst-case scenario. These values were chosen to reflect the highest potential impact from the site operations. If average emission rates were used in the model, it’s possible that the results would not be sufficiently sensitive to reflect the actual impact of the site operations. Atmospheric conditions data can be a leading cause in the variations of the model output. To improve the sensitivity of the model, 5 years of hourly sequential data was obtained from Enviro Data Services and used in the model. The recommendation is a minimum of 3 years. Parameters such as the stack height and exit diameter used in the model are actual, fixed measurements taken from documented technical drawings or from physical on-site measurements and therefore provide accurate input data which do not affect the sensitivity of the model results. The new boilers will be utilised as a back-up thermal source (see Section 2.2.2), running as duty & standby. They have been modelled as both units running 50% of the time. In practice, these units will have minimal run hours. Modelling as 50% operation per unit is equivalent to one boiler running constantly, which is considered a worst-case scenario.

Section 6:

6.1 Impact Assessment

6.1.1 Odour

The IAQM guidance refers to the EA's Technical Guidance Note H4, which provides guidance on how odorous emissions should be assessed for permitted activities. Odours are ranked according to their relative offensiveness and exposure criteria are assigned to each category. In the document H4 Odour Management (Environment Agency, March 2011), the Environment Agency has classified the relative 'offensiveness' of the odour arising from different types of process as 'most offensive', 'moderately offensive' or 'less offensive'. For each classification the Agency has defined a corresponding 'benchmark' odour exposure level. If the concentration of odour at sensitive receptors is above the relevant benchmark, then it is likely that there is unacceptable odour pollution. The benchmarks are expressed in terms of the 98th percentile of hourly concentrations (equivalent to 175 exceedances per year) and are given in Table 1.

Table 1:

Offensiveness Category	Benchmark
Less offensive	6 ouE/m^3
Moderately offensive	3 ouE/m^3
Most offensive	1.5 ouE/m^3

The 98th percentile of hourly mean odour concentrations has been calculated for concentrations of 1.5 ouE/m^3 which equates to 'most offensive'. Results show the 1.5 ouE/m^3 is not breached anywhere within the modelled domain (See Section 6.2 Contour Plots).

6.1.2 Ammonia

Critical Levels (Ecological Thresholds):
1.0 µg NH_3/m³ (annual mean): For sensitive lichens, bryophytes, or integral ecosystems.
3.0 µg NH_3/m³ (annual mean): For higher plants.

Modelling results show the maximum value from 5 years of meteorological data was 4.02 ug/m3, however, this was located within the site boundary. Long Term 1-hour contour plots show the 3.0 µg NH_3/m³ limit is not breached outside the site boundary. The nearest ecological receptor, Westwood, is located in the 0 – 0.5 µg NH_3/m³ boundary and therefore below the 1.0 µg NH_3/m³ (annual mean) for sensitive lichens, bryophytes, or integral ecosystems.

6.1.3 Hydrogen Sulphide

The UK does not have a single statutory ambient air quality standard for hydrogen sulphide Instead, dispersion modelling for is assessed against Environmental Assessment Levels (EALs) and site-specific planning conditions. Environmental Assessment Levels (EALs) The Environment Agency (EA) uses non-statutory EALs as benchmarks to assess the risk to public health and the environment for permitting purposes. The EALs for used in Environment Agency guidance are:

- 24-hour mean: 150 µg/m³
- Annual mean: 140 µg/m³

If the predicted ground-level concentration (PC) from modelling is below 1% of the relevant EAL, the impact is considered "insignificant". If it is 1% or greater, a more detailed assessment or consultation with the EA may be required. The maximum Long Term H_2S result from the 5 years of meteorological data was 0.042 ug/m^3, equivalent of 0.03% of the Annual Mean EAL, therefore impact considered “insignificant”.

6.1.4 Nitrogen Dioxide

UK Air Quality Standards Regulation (2010):

- Annual mean: 40 µg/m³
- No more than 18 exceedances of the hourly mean limit value (concentrations above 200 µg/m^3) in a single year (modelled as the 99.79th percentile).

The maximum annual mean result over 5 years of meteorological data was 11.1 ug/m3, therefore below 40 ug/m^3 standard. Maximum NO_2 concentration above 99.79% percentile was 127.7 ug/m^3, this equates to zero exceedances over 200 ug/m³ (See Table in Section 6.1.6)

6.1.5 Sulphur Dioxide

Limit values for dispersion modelling assessments for human health compare predicted ground-level concentrations against the following limit values:

- 1-hour mean: 350 µg/m³ not to be exceeded more than 24 times in a calendar year (modelled as the 99.73th percentile).
- 24-hour mean: 125 µg/m³ not to be exceeded more than 3 times in a calendar year. Not assessed in model.
- 15-minute mean: 266 µg/m³ not to be exceeded more than 35 times per year (modelled as the 99.9th percentile).

The maximum Long Term 1-hour mean result over 5 years of modelled meteorological data was 7.4 ug/m³ (2021 & 2022 met data). Maximum SO_2 concentration above the 99.73% percentile was 85.1 ug/m³ (2024 Met data), this equates to zero exceedances over 350 ug/m³.
The maximum Long Term 15-minute mean result over 5 years of modelled meteorological data was also 7.4 ug/m³ (2021 & 2022 met data). The maximum SO_2 concentration above the 99.9% percentile was 85.1 ug/m³ (2024 Met data), this equates to zero exceedances over 266 ug/m³.

Critical Levels for Ecosystems:
For the protection of vegetation and ecosystems in non-urban areas (typically rural areas more than 20km from agglomerations), assessments use the following critical levels:

- Annual mean: 20 µg/m³

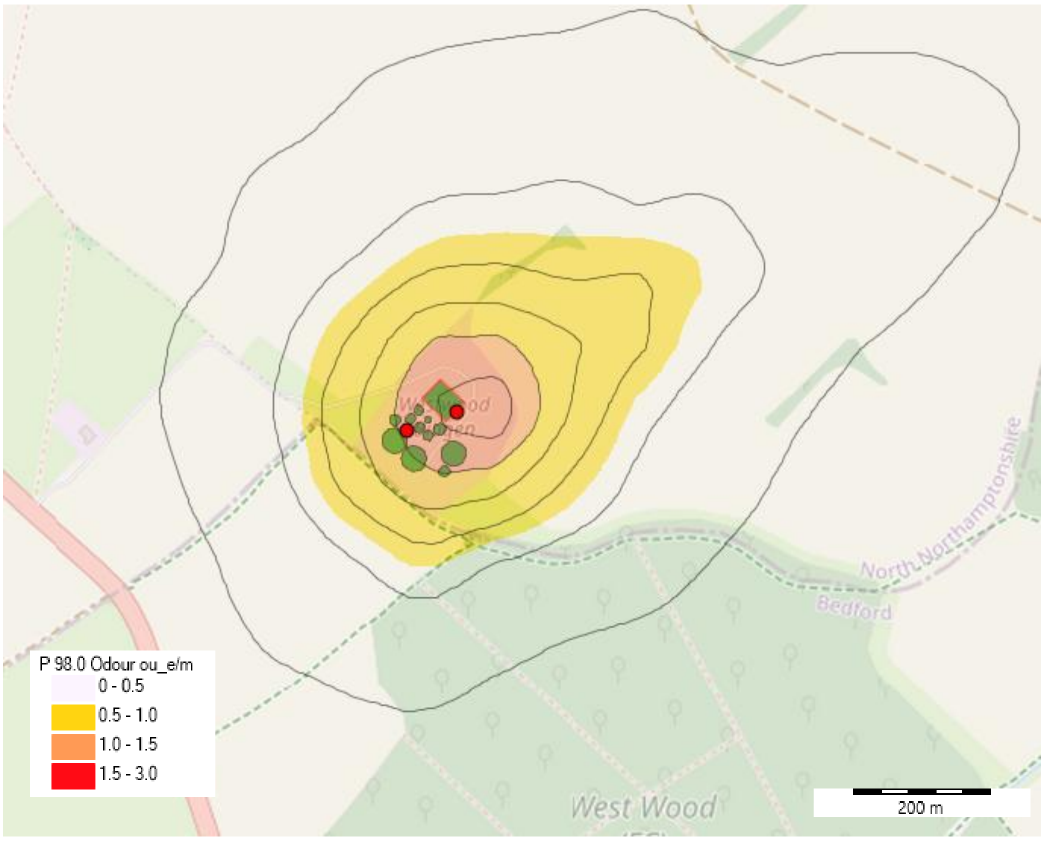
Average annual mean result was 7.2 ug/m³, therefore below 20 ug/m³ standard.

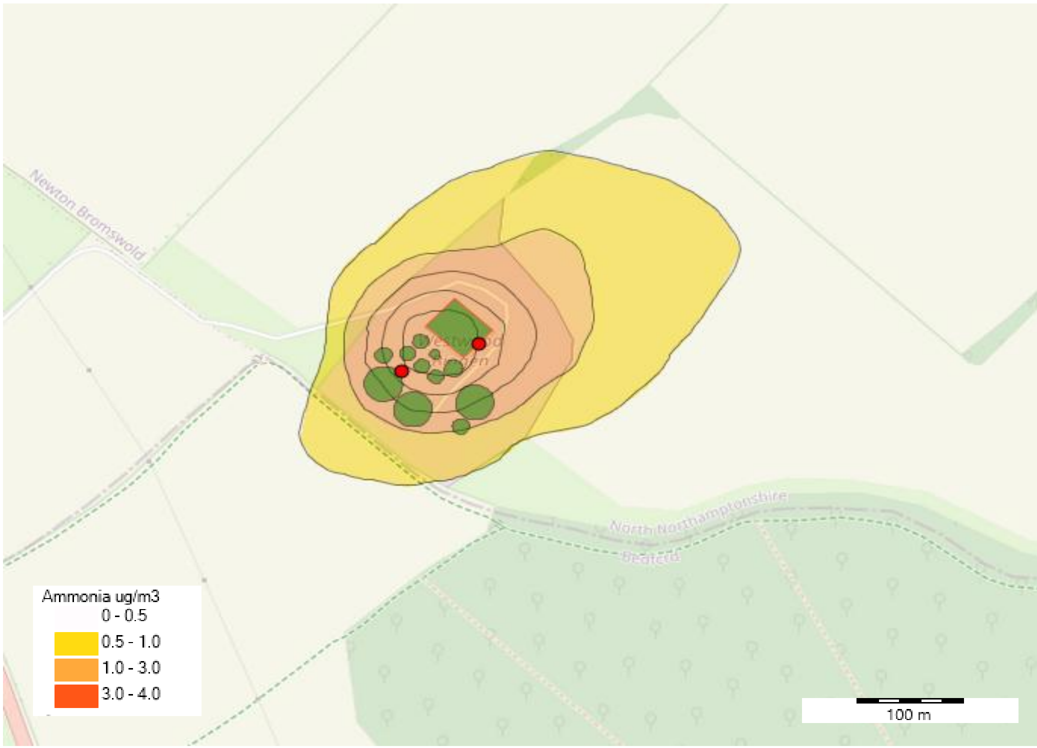
6.1.6 Boiler Modelling Results against UK Air Standards Limits

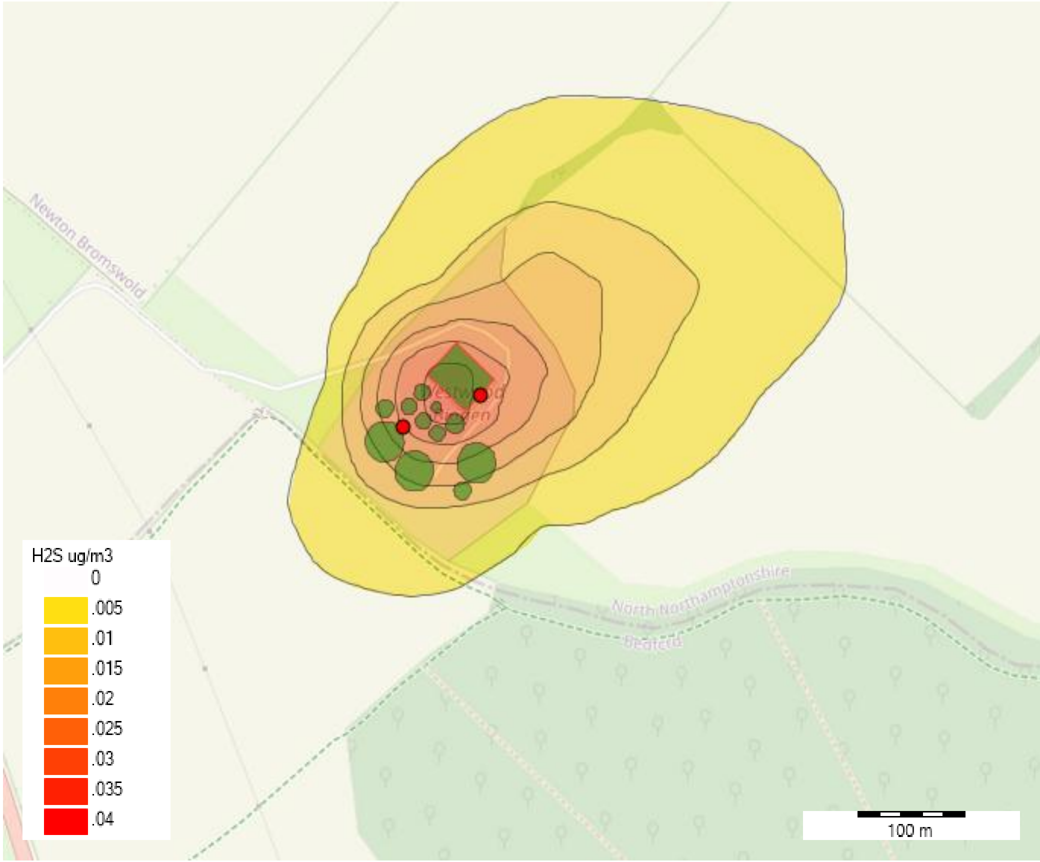
Output	UK Air Std Limit (ug/m³)	2020 Met Data Result (ug/m³)	2021 Met Data Result (ug/m³)	2022 Met Data Result (ug/m³)	2023 Met Data Result (ug/m³)	2024 Met Data Result (ug/m³)	Average 2020 - 2024 (ug/m³)
NO_2 Max. LT 1hr Ave. Conc (PC)		10.3	11.1	11.1	10.5	10.9	**10.8**
NO_2 1hr 99.79 Percentile	200 ug/m³ not more than 18 times a year	110.8	116.9	116.9	111.8	114.0	**114.1**
NO_2 Max Conc. Above Percentile	200 ug/m³ not more than 18 times a year	123.4	123.5	123.5	125.4	127.7	**124.7**
No. of Exceedances over 200 ug/m³		0	0	0	0	0	
SO_2 Max. LT 15min Ave. Conc (PC)		6.8	7.4	7.4	7.0	7.2	**7.1**
SO_2 15min 99.9 Percentile	266 ug/m³ not more than 35 times a year	78.0	80.1	80.1	78.1	79.0	**79.1**
SO_2 Max Conc. Above Percentile	266 ug/m³not more than 35 times a year	82.2	82.3	82.3	83.6	85.1	**83.1**
No. of Exceedances over 266 ug/m³		0	0	0	0	0	
SO_2 Max. LT 1hr Ave. Conc (PC)		6.9	7.4	7.4	7.0	7.3	**7.2**
SO_2 1hr 99.73 Percentile	350 ug/m³not more than 24 times a year	72.6	76.4	76.4	72.4	74.7	**74.5**
SO_2 Max Conc. Above Percentile	350 ug/m³not more than 24 times a year	82.2	82.3	82.3	83.6	85.1	**83.1**
No. of Exceedances over 350 ug/m³		0	0	0	0	0	

6.2 Contour Plots – Odour, Ammonia & Hydrogen Sulphide

6.2.1 - 2020 Meteorological Data Results






Newton Bromswold
North Northamptonshire
Bedford
H2S ug/m3
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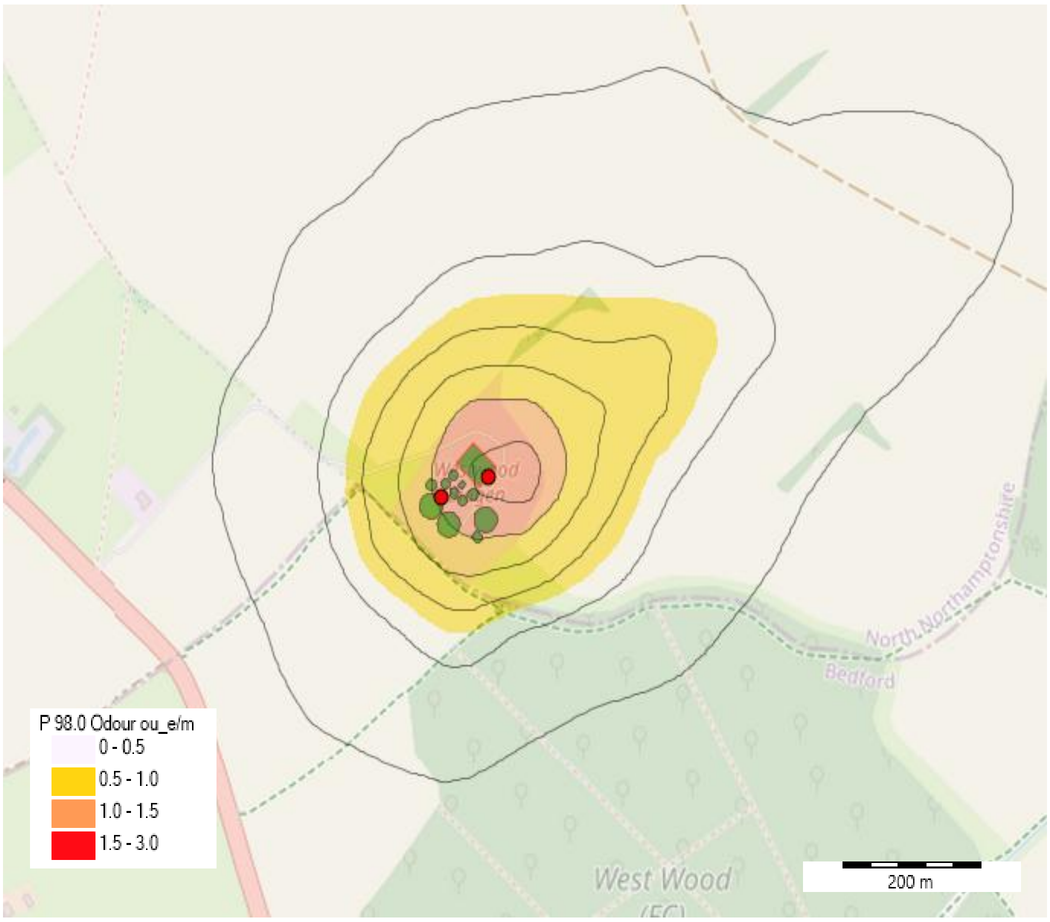
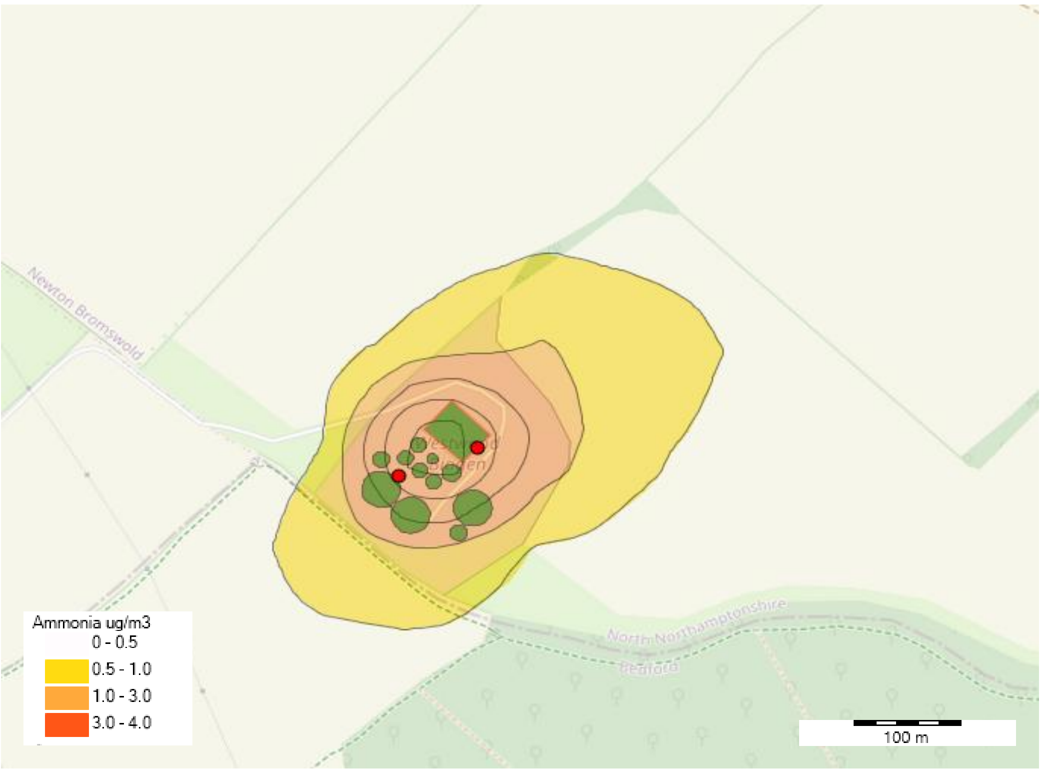
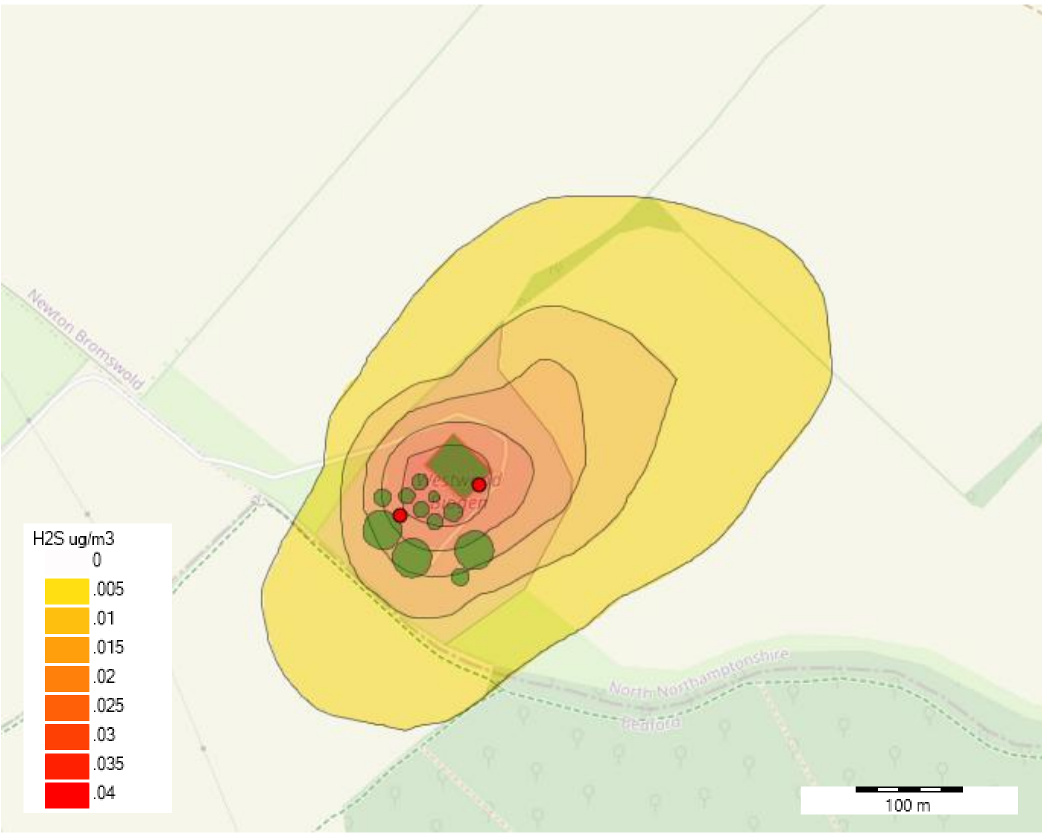
.02
.025
.03
.035
.04
100 m

6.2.2 - 2021 Meteorological Data Results



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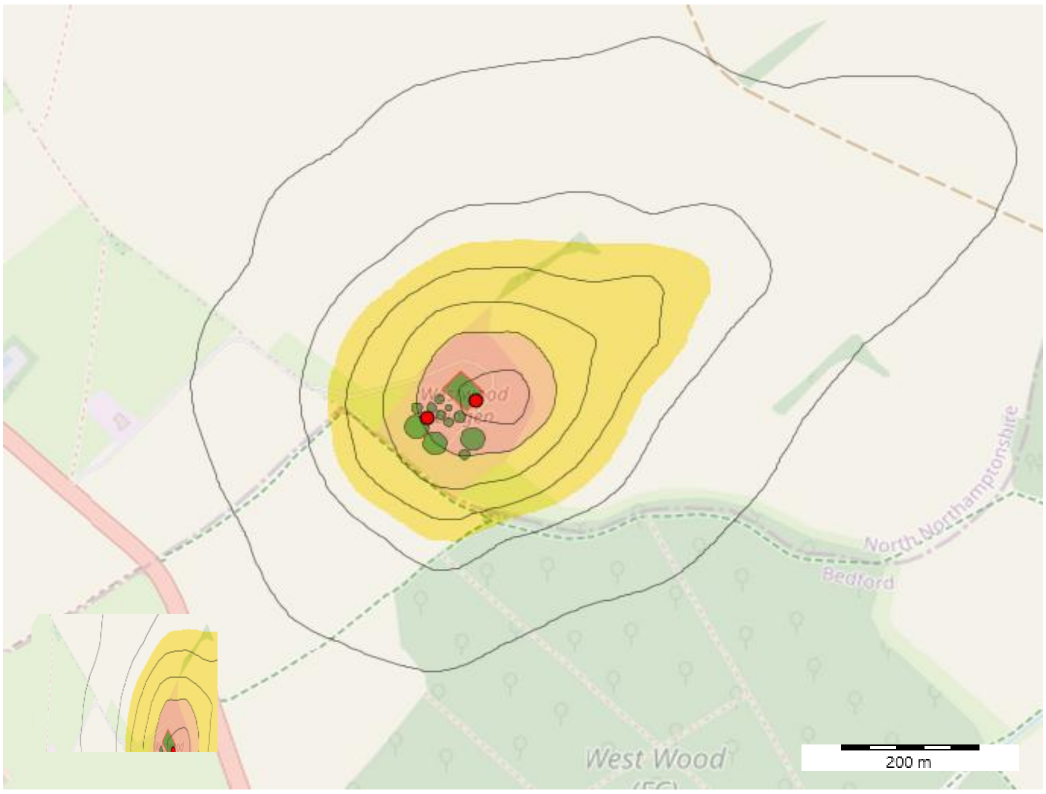
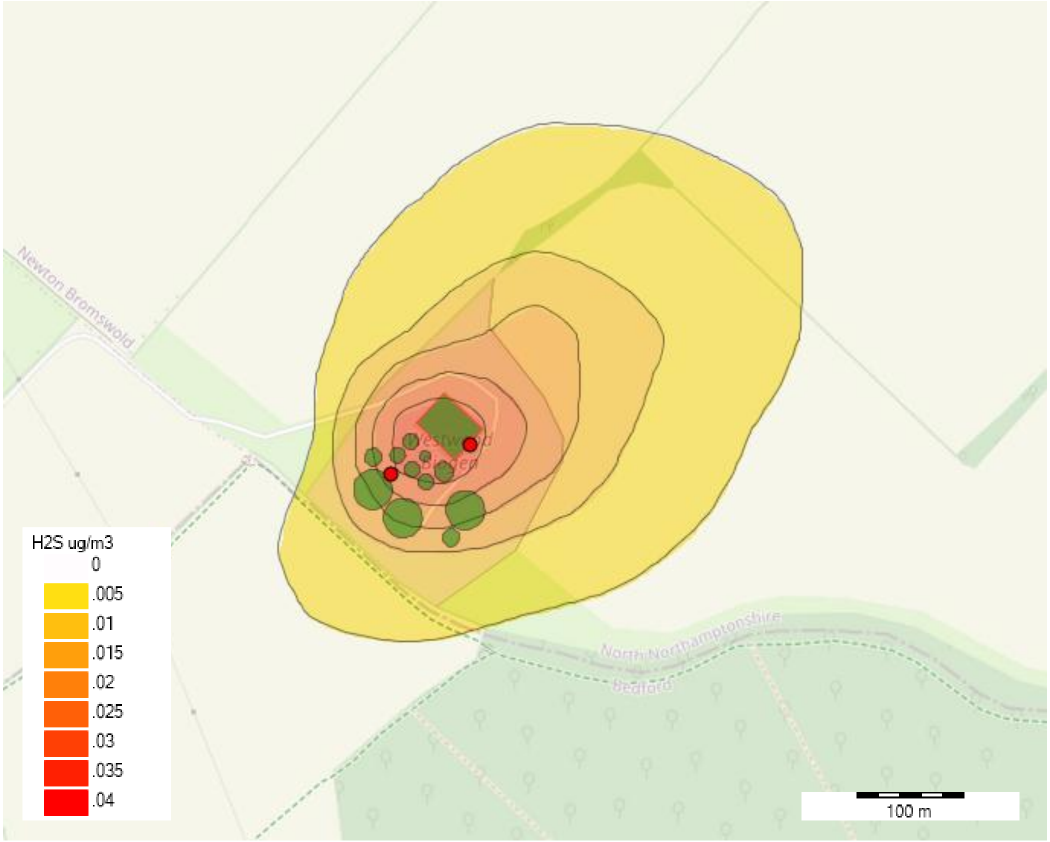
Bedford

6.2.3 - 2022 Meteorological Data Results

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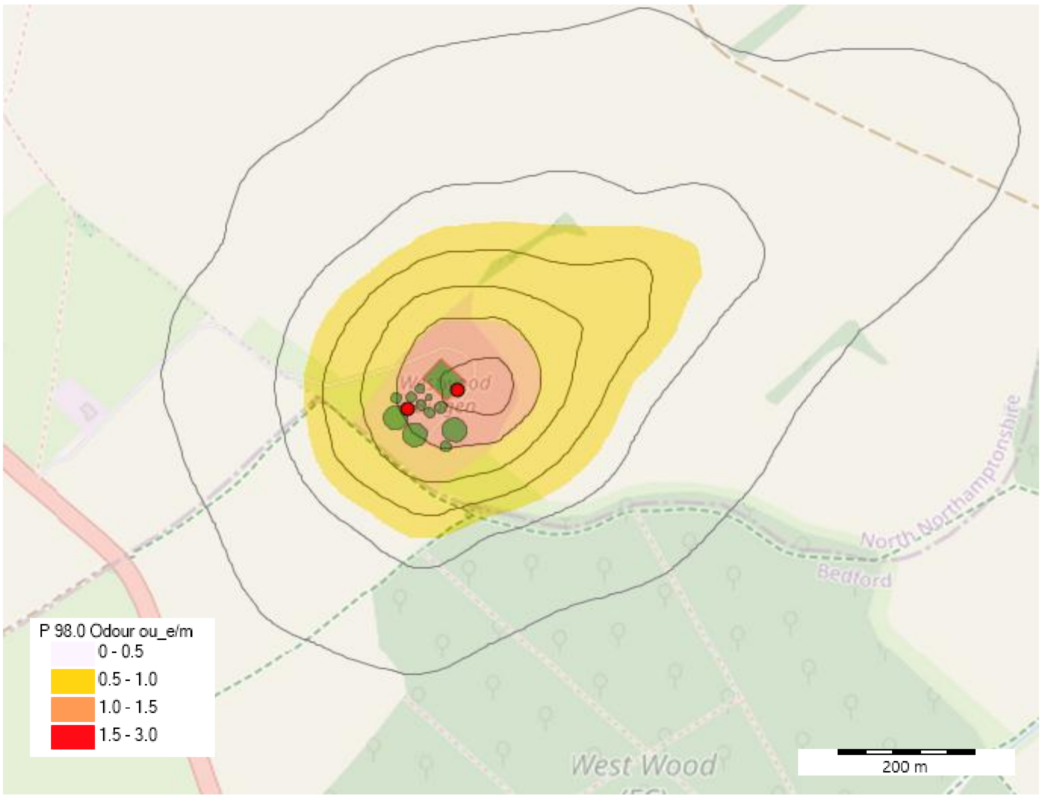
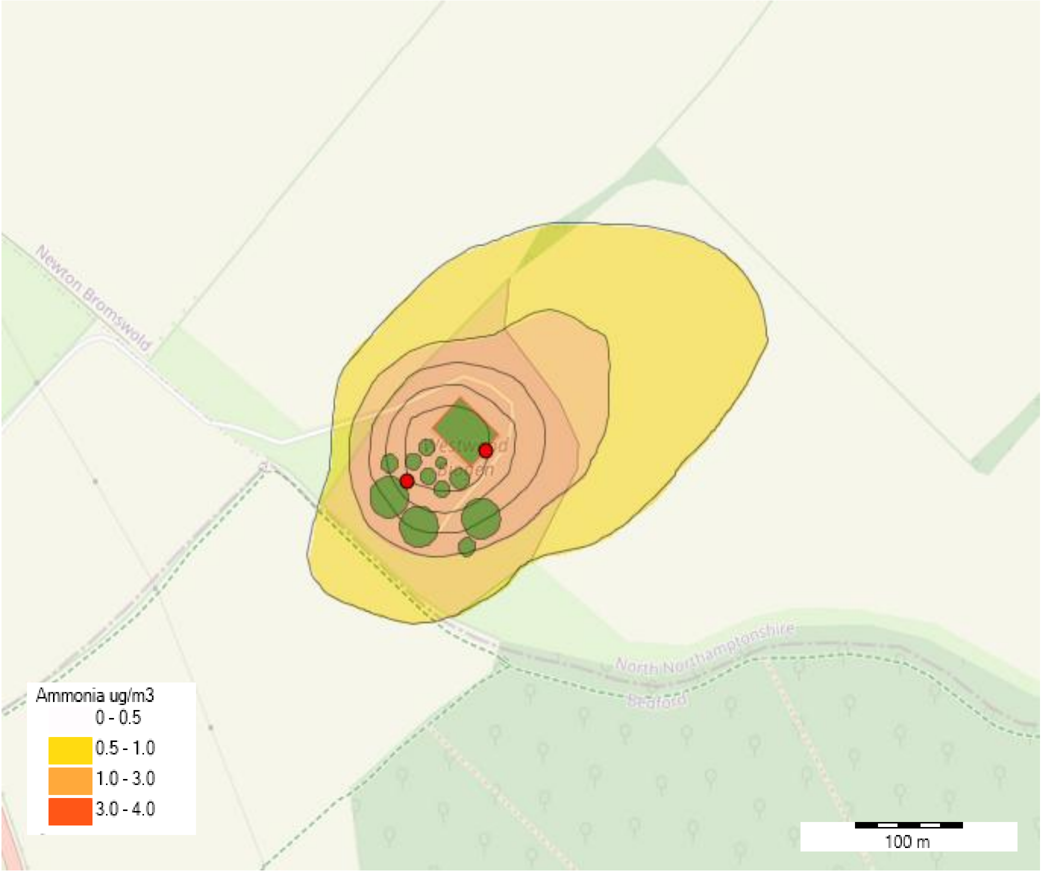
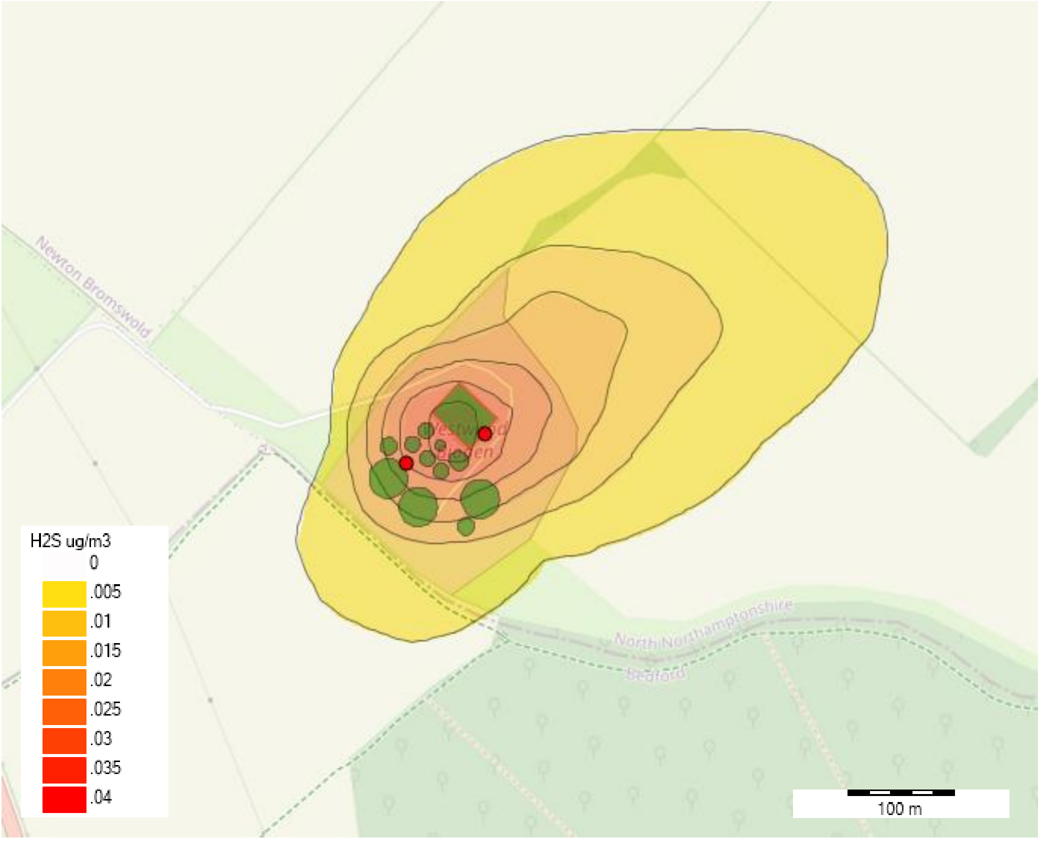
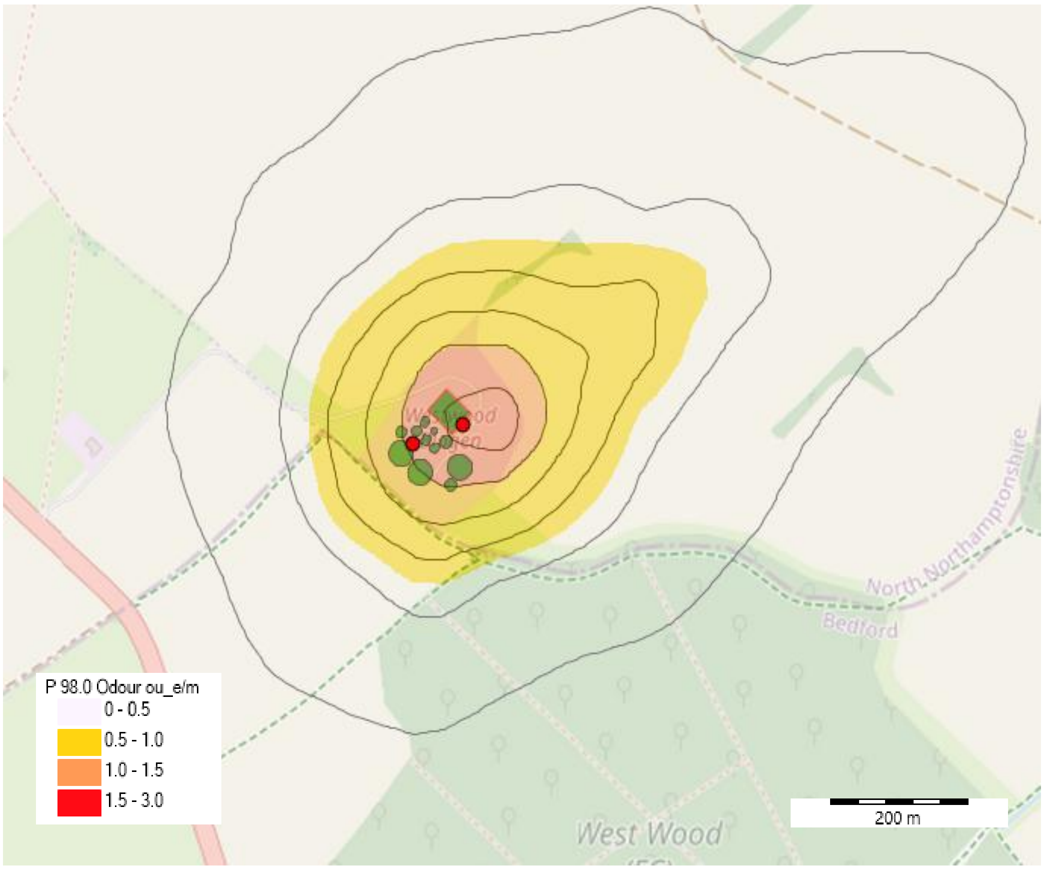
6.3.4 - 2023 Meteorological Data Results

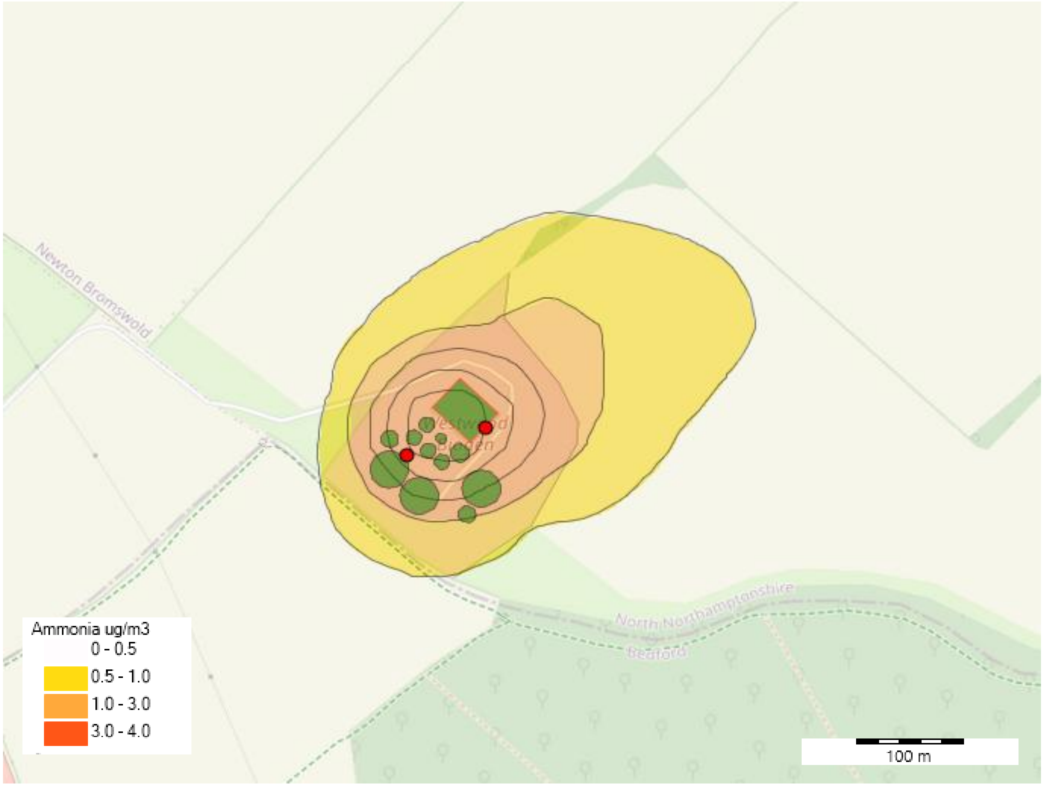


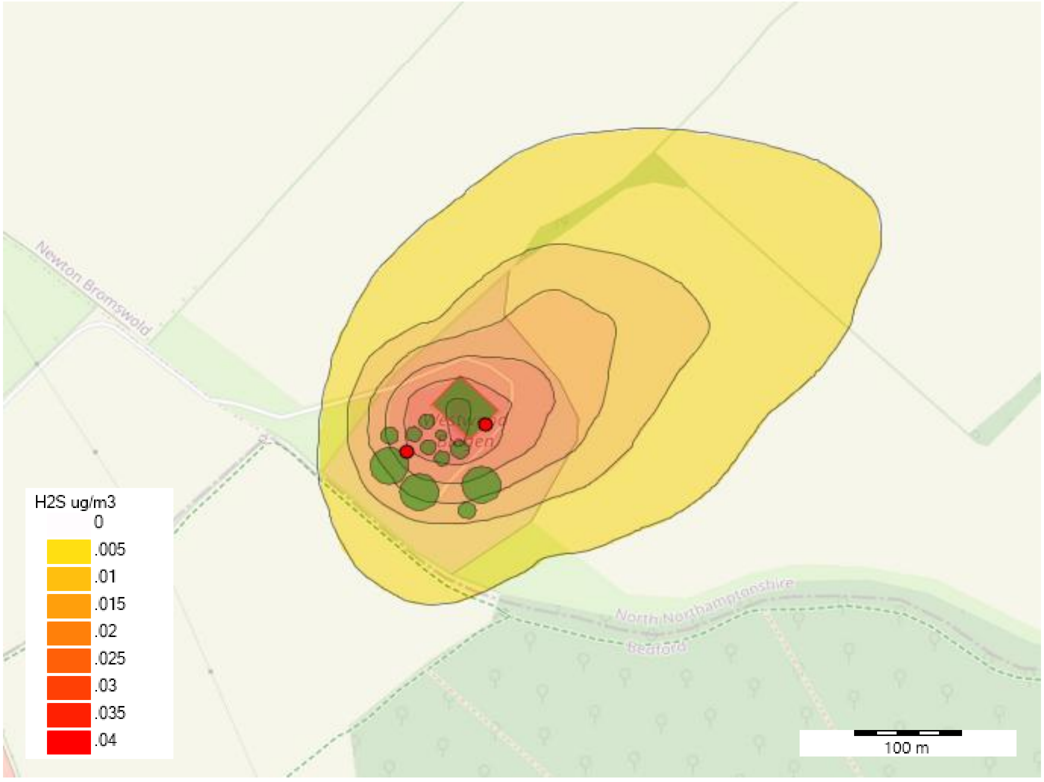



Newton Bromswold
North Northamptonshire
Bedford
H2S ug/m3
0
.005
.01
.015
.02
.025
.03
.035
.04
100 m

6.2.5 - 2024 Meteorological Data Results






Newton Bromswold
H2S ug/m3
0
.005
.01
.015
.02
.025
.03
.035
.04
North Northamptonshire
Bedford
100 m

6.3 Contour Plots – Nitrogen Dioxide & Sulphur Dioxide

6.3.1 - 2020 Meteorological Data Results


NO2 LT 1hr ug/m3
0
2
4
6
8
10
50 m
Westwood
Biogen
Newton Bromswold
Bedford

6.3.2 - 2021 Meteorological Data Results


Westwood Biogen
Newton Bromswold
Bedford
NO2 LT 1hr ug/m3
0
2
4
6
8
10
50 m

6.3.3 - 2022 Meteorological Data Results


NO2 LT 1hr ug/m3
0
2
4
6
8
10
Westwood
Biogen
Newton Bromswold
Bedford
50 m

6.3.4 - 2023 Meteorological Data Results


NO2 LT 1hr ug/m3
0
2
4
6
8
10
50 m
Westwood
Biogen
Newton Bromswold
Bedford
Bedford
Bedford

6.3.5 - 2024 Meteorological Data Results


Westwood
Biogen
Newton Bromswold
Bedford
NO2 LT 1hr ug/m3
0
2
4
6
8
10
50 m

6.4 Conclusions

The purpose of the study was to demonstrate that the emissions to air from the new Gas to Grid (G2G) Odour Control Units (OCUs) and Boiler plant operations will not have significant impacts on the air quality outside the site boundary of the Westwood Anaerobic Digestion Site. For the two OCU's, the modelling predictions for odour show that the EA's Technical Guidance Note H4 benchmark of 1.5 ou_E/m^3, for 'Most Offensive' odours is not breached anywhere within the modelled domain and therefore there is no significant predicted odour impact from the site activities. The results for ammonia show that maximum value from 5 years of meteorological data was 4.02 ug/m3, however, this was located within the site boundary. The critical level threshold of 3.0 µg NH_3/m^3 (annual mean): For higher plants; is not breached outside of the site boundary. The nearest ecological receptor, Westwood, is in the 0 – 0.5 µg NH_3/m^3 contour and therefore below the 1.0 µg NH_3/m^3 (annual mean) for sensitive lichens, bryophytes, or integral ecosystems. For the hydrogen sulphide results, the maximum Long Term H_2S result from the 5 years of meteorological data was 0.042 ug/m^3, which is equivalent of 0.03% of the Annual Mean Environment Assessment Level (140 ug/m^3), therefore the impact is considered "insignificant". Modelling predictions for the two OCU's show the emissions to air will have minimal impact on the air quality outside the site boundary.

The modelling prediction results for the two biogas boilers show that for NO_2 emissions to air, the UK Air Quality Standards Regulation (2010) Annual mean limit of 40 µg/m³ was not breached either inside or outside of the site boundary. Additionally, results show there were zero exceedances of the hourly mean limit value (concentrations above 200 µg/m³) in a single year, which meets the criteria of no more than 18 exceedances stipulated in the regulation (See Section 6.1.6). The modelling prediction results for the two biogas boilers show that for SO_2 emissions to air there were zero exceedances in both the UK Air Quality Standards Regulation (2010) limit values of 350 µg/m³ (1-hour mean) not to be exceeded more than 24 times in a calendar year and 266 µg/m³ (15-minute mean) not to be exceeded more than 35 times per year (See Section 6.1.6). Additionally, for the protection of vegetation and ecosystems in non-urban areas, the modelling prediction results show the assessment level of 20 ug/m^3 was not breached within the modelled domain. Modelling predictions for the two biogas boilers show the emissions to air will have minimal impact on the air quality outside the site boundary.

Overall, the modelling predictions of this study demonstrate that the emissions to air from the new Gas to Grid (G2G) Odour Control Units (OCUs) and Boiler plant at the Westwood Anaerobic Digestion will have minimal impact on the air quality outside the site boundary.

APPENDIX

Appendix 1: Westwood Odour Management Plan

Odour Management Plan (Westwood).docx

Appendix 2: Westwood Site Elevation Plan

WW-PL-004 - Westwood Plans-A1 -

Appendix 3: Westwood Proposed Odour Control Unit Drawings

BIOGEN WESTWOOD - Waste Reception Ha

BIOGEN WESTWOOD - Storage Tank & Borg