CONTENTS

TABLES

FIGURES

APPENDICES

7. AIR QUALITY

Introduction

7.1 This chapter of the ES considers the potential for the Proposed Development to affect local air quality. The assessment of effects has been made on the basis of the proposed development which has been fully described in **Chapter 3: Project Description**.

7.2 The chapter describes the relevant legislation, assessment methodology and the baseline conditions currently existing at the application site and its surroundings. It then details the assessment undertaken to determine the potential effects of both the construction and operation of the proposed development on the baseline Air Quality. It outlines the embedded design measures and good practice methods which have been incorporated into the design and would be used during the construction and operation of the proposed development to prevent or reduce identified effects and risks.

7.3 Further mitigation methods to ameliorate any potential effects are proposed, where appropriate, and residual effects assessed.

7.4 This Chapter uses data and information presented in the following:

- Appendix 7.A; Air Quality Assessment

Scope of Work

7.5 The assessment scope has been informed by both national and local planning policy and guidance, established best practice and experience, as well as via the consultation process from consultees. The assessment scope is consistent with the approach proposed within the Scoping Report, taking into account consultation comments received to date.

7.6 The objective of the assessment is to consider the potential air quality effects arising from the construction and operation of the proposed development on the surrounding environment.

Process Description

7.7 The AD facility would accept in the region of 92,000 tonnes per annum (tpa) of feedstock from local farms. The facility harvests biogas from the digestion of the feedstock, for upgrade and eventual off-site export as biomethane. Site facilities include storage facilities for the incoming feedstock types, digestors, digestate lagoons, digestate separator and a power generation unit (comprising two Combined Heat and Power (CHP) engines).

7.8 The feedstocks utilised would consist mostly of straw and silage (rye, maise, oat and grass), comprising approximately 70% of the total, with the remainder comprising poultry litter and farmyard manure (FYM) (remaining 30%).

7.9 Silage and straw feedstocks would be received by road via tractors or lorries with open trailers. Poultry litter and FYM would be received within enclosed trailers.

7.10 Silage feedstocks would be stored within the designated outdoor area (Clamps 1, 2 and 3), a concrete hardstanding area with retaining walls, and covered by weighed-down sheeting). Straw would be stored within the Straw Bunker, a partially enclosed barn on hard-standing surface, providing protection from the weather.

7.11 Poultry litter and FYM would be stored within the Manure Shed, which would be enclosed with air extracted and treated by a dedicated abatement system.

7.12 Feedstock handling operations would comprise the movement of silage from the clamps, straw from the Straw Bunker and poultry litter and FYM from the Manure Shed. The handling operations would be undertaken by a front-end loader (or similar such vehicle). Feedstock would be deposited within the hoppers periodically to load the digesters with new feedstock as required.

7.13 Leachate from Clamps 1, 2 and 3 would be pumped to the leachate/digestate storage tank. The tank would be enclosed and fitted with passive ventilation (grating/louvre). The leachate would be diluted with rainwater runoff from the hardstanding clamp areas.

7.14 Following anaerobic digestion, the solids and liquids within the digestate would be separated, removing most of the liquid from the digestate. The liquid fraction (liquid digestate) would be pumped to the lagoons and the solid fraction (solid digestate) stored within the Separator building pending export. The Separator would be located within an enclosed building with passive ventilation (the Separator Building). The solid digestate (fertiliser) produced by the Separator would be stored within a dedicated bay within the Separator building prior to export offsite. It is anticipated that solid digestate would only be stored at the Site for short periods, pending regular collections for off-site export.

7.15 Following anaerobic digestion, liquid digestate would be stored within a covered lagoon.

7.16 Road tankers will remove liquid digestate from the Site through use of a vacuum pumping system.

7.17 Generation of heat and power for the proposed operations would be provided by two CHP engines.

7.18 For further information, see Chapter 3: Project Description.

7.19 Based on the above, the scope of the assessment comprises:

- a review of baseline conditions at the application site;
- construction phase assessment;
- qualitative assessment of fugitive dust emissions arising from anticipated construction activities;
- consideration of road traffic trips generated by construction activities;
- operational phase assessment;
- quantitative assessment of ammonia and CHP combustion emissions;

- screening assessment of odour, dust and bioaerosols;
- screening assessment of road traffic trips generated by operational activities; and
- identification of appropriate mitigation measures.

Consultations / Consultees

The Environmental Health department at West Suffolk Council (WSC) was consulted on the methodology and scope of the assessments. A response received from the Environmental Health Officer (EHO) raised no "comments or questions" regarding the proposed methodology and scope of assessment.

Legislation and Planning Policy Guidance – Air Quality

Air Quality Strategy

7.20 The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales, and Northern Ireland (AQS) most recently updated in July 2007. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK.

7.21 The AQS sets standards and objectives for ten priority pollutants. Standards are the concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. Objectives, however, are policy targets often expressed as maximum concentrations not to be exceeded. These are either without exception or with a limited number of exceedances within a specified timescale.

7.22 The strategy objectives for the pollutants considered in this report are presented in the following sections.

Air Quality Regulations

7.23 The Air Quality Standards Regulations 2010 (the regulations) include Limit Values, Target Values, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment (collectively termed Air Quality Assessment Levels (AQAL) throughout this report). Those relevant to this Air Quality Assessment are presented in the following sections.

Local Air Quality Management (LAQM)

7.24 Section 82 of the Environment Act 1995 (Part IV) requires local authorities to periodically review and assess the quality of air within their administrative area. The reviews consider the present and future air quality and whether any AQALs prescribed in regulations are being achieved or are likely to be achieved in the future.

7.25 Where any of the prescribed AQALs are not likely to be achieved the authority concerned must designate an Air Quality Management Area (AQMA). For each AQMA the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to

introduce to deliver improvements in local air quality in pursuit of the AQAL. As such, Local Authorities (LAs), have formal powers to control air quality through a combination of LAQM and by use of their wider planning policies.

7.26 Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their LAQM work[1]. This guidance, referred to in this report as LAQM.TG(22), has been used where appropriate in the assessment presented here.

General Nuisance Legislation

7.27 Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows local authorities and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance.

7.28 Fractions of dust greater than 10µm (i.e. greater than PM_{10}) in diameter typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the UK AQS. In legislation, there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

Protection of Ecological Receptors

7.29 Sites of nature conservation importance at a European, national and local level, are provided environmental protection from developments, including from atmospheric emissions via the following legislation:

- Conservation of Habitats and Species Regulations 2017 ('Habitats Regulations'), as amended;
- Wildlife & Countryside Act 1981.

Environmental Permitting Regulations

7.30 The AD Facility is a type of operation that would be regulated under the Environmental Permitting (England and Wales) Regulations 2016 (as amended). The EP Regulations include requirements on operating conditions, monitoring and Emission Limit Values (ELVs) that would be incorporated into the site's Permit and would be enforceable by the Environment Agency (EA).

7.31 Various guidance documents are provided by the EA with respect to the operation and assessment of impacts from facilities regulated under EP Regulation. Key to air quality assessments is the 'Air Emissions Risk Assessment for your Environmental Permit' (AERA) guidance. The AERA guidance provides Environmental Assessment Levels (EALs) for pollutants not covered under the AQS or

[1] Department for Environment, Food and Rural Affairs (DEFRA): Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(22), 2021.

AQSR, such as ammonia and guidance on assessing impacts on ecological receptors. Other guidance documents address assessment of risks from bioaerosols.

Environmental Standards

Standards for the Protection of Human Health

7.32 The standards applied in this assessment are presented in Table 7-1.

Table 7-1
Applied Air Quality Assessment Levels

Pollutant	Standard (µg/m³)	Measured As		Ref.
Nitrogen Dioxide (NO_2)	40	Annual Mean	-	AQS
	200	1-hour Mean	not to be exceeded more than 18 times per year	
Sulphur Dioxide (SO_2)	125	24-hour Mean	not to be exceeded more than 3 times a calendar year	
	350	1-hour Mean	not to be exceeded more than 24 times a calendar year	
	266	15-minute mean	not to be exceeded more than 35 times a calendar year	
Particles (PM_{10})	40	Annual Mean	-	
	50	24-hour mean	not to be exceeded more than 24 times a calendar year	
Particles ($PM_{2.5}$)	20	Annual Mean	-	
Ammonia (NH_3)	180	Annual Mean	-	AERA
	2,500	1-hour Mean	-	

7.33 In accordance with the DEFRA technical guidance on Local Air Quality Management (LAQM.TG(22)), the AQALs should be assessed at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. A summary of relevant exposure for the objectives presented in Table 7-1 are shown below in Table 7-2.

Table 7-2
Human Health Relevant Exposure

AQAL Averaging Period	Relevant Locations	AQALs should apply at	AQALs should not apply at
Annual Mean	Where individuals are exposed for a cumulative period of 6-months in a year	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	Where individuals may be exposed for eight hours or more in a day	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	Where individuals might reasonably be expected to spend one hour or longer	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access
15-minute Mean	Where individuals might reasonably be expected to spend 15-minutes or longer	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	-

Standards for the Protection of Ecosystems and Vegetation

Critical Levels (C_{Le})

7.34 C_{Le}'s are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. The relevant C_{Le} for the protection of vegetation and ecosystems is specified within the UK air quality regulations and AERA guidance, as presented in Table 7-3 below.

Table 7-3
Relevant C_{Le} for the Protection of Vegetation and Ecosystems

Pollutant	Concentration (µg/m^3)	Habitat and Averaging Period
Nitrogen oxides (NO_x)	30	Annual mean (all ecosystems)
	75 (A)	Daily mean (all ecosystems)
Ammonia (NH_3)	3.0 (B)	Annual mean
Sulphur dioxide (SO_2)	10	Annual mean (where lichens or bryophytes are present)
	20	Annual mean (all ecosystems)

Pollutant	Concentration (µg/m^3)	Habitat and Averaging Period
Table note: (A) The 24-hour mean NO_x critical level is applied 75 µg/m^3, with the exception that 200 µg/m^3 is applied where the ozone is below the AOT40 critical level and sulphur dioxide is below the lower critical level of 10 µg/m^3. (B) A more stringent level (1.0 µg/m^3) applies where lichens and bryophytes form a key part of the ecosystem integrity.		

Critical Loads (C_{Lo})

7.35 C_{Lo}'s are a quantitative estimate of exposure to deposition of one or more pollutants, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. Critical loads are set for the deposition of various substances to sensitive ecosystems. In relation to combustion emissions, critical loads for eutrophication and acidification are relevant. Eutrophication and acidification can occur via both wet and dry deposition; however on a local scale only dry (direct deposition) is considered significant. The UK Air Pollution Information System (APIS) website (www.apis.ac.uk/) has been consulted for relevant C_{Lo}'s for the sites subject to assessment (presented in Section 0).

Planning Policy

National Policy

7.36 The 2021 update to the National Planning Policy Framework (NPPF) describes the policy context in relation to pollutants including air pollutants:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of […] air […] pollution […]. Development should, wherever possible, help to improve local environmental conditions such as air […] quality […]"

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

Specifically, in terms of development with regards to air quality:

"*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. Opportunities to improve air quality or mitigate impacts should be identified, such as through*

traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. 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."

7.37 The NPPF is accompanied by supporting Planning Practice Guidance2 (PPG) which includes guiding principles on how planning can take account of the impacts of new development on air quality. The November 2019 update to the PPG includes the following in regard to air quality:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species)."

7.38 The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that *"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions) […] Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact"*.

The policies within the NPPF and accompanying PPG in relation to air pollution are considered within this assessment.

Local Policy

7.39 Whilst the application is submitted to Suffolk County Council, the Site lies within the administrative area of WSC, which was established on the 1st of April 2019. WSC is made up of the former administrative areas of Forest Heath District Council (FHDC) and St Edmundsbury Borough Council (SEBC), therefore the local plan for WSC is formed from a joint development plan which conforms with the core strategies for both FHDC and SEBC. The Joint Development Management Policies Document (JDMPD) was developed in February 2015. The JDMPD presents the strategy for the development and use of land in the district, as well as containing the policies for delivering these objectives. It is also noted that at the time of writing, the West Suffolk Local Plan is under review, consultation to be concluded by 26th July, to establish the long term planning and land use policies for the area.

7.40 The following policy of the JDMPD was identified to be of direct relevance to this assessment:

[2] Planning Practice Guidance Air Quality (2014) (June 2021 Update) Ministry of Housing, Communities and Local Government. https://www.gov.uk/government/collections/planning-practice-guidance

Policy DM14: Protecting and Enhancing Natural Resources, Minimising Pollution and Safeguarding from Hazards:

"Development will not be permitted where, individually or cumulatively, there are likely to be unacceptable impacts arising from the development on:

- *the natural environment, general amenity and the tranquillity of the wider rural area;*
- *health and safety of the public;*
- *air quality; or*
- *[…]*
- *compliance with statutory environmental quality standards."*

7.41 Consideration has been given to the above policy within this assessment.

Assessment Guidance

7.42 The air quality assessment has been carried out with reference to the principles contained within the following guidance documents:

- Defra: Local Air Quality Management Technical Guidance (LAQM.TG(22));
- Defra: COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021[3];
- IAQM: Use of 2020 and 2021 Monitoring Datasets[4];
- Environmental Protection UK (EPUK) and the Institute of Air Quality Management Guidance (IAQM): Land-Use Planning and Development Control: Planning for Air Quality[5];
- IAQM: Guidance on the Assessment of Dust from Demolition and Construction[6];
- IAQM: Guidance on the assessment of odour for planning[7];
- IAQM: Guidance on the Assessment of Mineral Dust Impacts for Planning[8];
- EA position statement 031: Composting and potential health effects from bioaerosols;
- EA: Air emissions risk assessment for your environmental permit;
- European Monitoring and Evaluation Programme (EMEP) and the European Environment Agency (EEA): Air Pollutant Emission Inventory Guidebook[9];
- Ammonia Mitigation User Manual[10]; and
- Ammonia emissions from UK non-agricultural sources in 2017[11].

[3] DEFRA and the Greater London Authority, COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021. April 2021.
[4] Use of 2020 and 2021 monitoring datasets, August 2021, Version 1.0. Institute of Air Quality Management. Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/IAQM_2020_and_2021_monitoring_datasets.pdf.
[5] EPUK and IAQM, Land-Use Planning and Development Control: Planning for Air Quality, 2017.
[6] IAQM, Guidance on the Assessment of Dust from Demolition and Construction, v1.1, 2016.
[7] IAQM, Guidance on the assessment of odour for planning, Version 1.1, July 2018.
[8] IAQM, Guidance on the Assessment of Mineral Dust Impacts for Planning, v1.1, 2016.
[9] EMEP/EEA Air Pollutant Emission Inventory Guidebook, Appendix 5.B.2 (Biological treatment of waste).
[10] Ammonia Mitigation User Manual, Misselbrook, 2008.
[11] Ammonia emissions from UK non-agricultural sources in 2017, Centre for Ecology & Hydrology, 2018.

- EA Operational Instruction 66_12[12]; and
- The EA AQTAG.06 guidance[13] for assessing impacts on ecological sites.

Significance Criteria

7.43 The following sections provide a summary of the assessment criteria and assessment methodologies used to assess air quality, which are derived from best practice guidance documents, outlined above. Further details can be found in Appendix 7.A Air Quality Assessment.

Construction Dust Assessment

7.44 The assessment of dust generated by potential construction activities on nearby sensitive human and ecological receptors has been undertaken in accordance with the UK's IAQM construction guidance (IAQM, 2016).

7.45 The spatial extent of the study area for the construction dust assessment has been defined on the following threshold distances outlined in IAQM construction dust guidance (IAQM, 2016):

- human receptors within 350m of the site boundary and within 50m of routes used by construction vehicles up to 500m from the site entrance; and
- ecological receptors within 50m of the site boundary and within 50m of routes used by construction vehicles up to 500m from the site entrance.

7.46 The likely unmitigated dust emission magnitude associated with four activities (demolition, earthworks, construction and trackout) is used in conjunction with the sensitivity of the surrounding area to determine the risk of impact for each activity. These sensitivities are:

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to PM_{10}, and
- harm to ecological receptors.

7.47 The risk of impact is then used to determine proportionate mitigation requirements, whereby through effective application, residual effects are considered to be not significant in terms of the EIA Directive.

7.48 Significance is only assigned to the effect after considering the construction activity with mitigation. This is because for construction activities, the aim is to prevent significant effects on receptors through the use of effective mitigation.

---

[12] EA Operational Instruction 66_12: Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation'.

[13] AQTAG06 – Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air. Environment Agency, March 2014 version.

7.49 The IAQM construction guidance (IAQM, 2016) therefore does not provide a framework to determine the significance of unmitigated effects, as is not considered appropriate nor relevant in this context. For these reasons, the significance of the unmitigated effect of construction dust cannot be defined.

Operational Road Traffic Assessment

7.50 The assessment of air quality effects in relation to traffic generated during the construction and operational phase of the Proposed Development has been screened in accordance with the EPUK-IAQM and DMRB guidance. This comprises a two-staged screening process to identify where further assessment is required. If the Proposed Development does not meet exceed the screening criteria, then effects are considered insignificant.

7.51 The applied screening procedure is as follows:

- Stage 1: Comparison of road traffic trips generated by the Proposed Development with reference to EPUK-IAQM thresholds to determine the extent of the affected road network:
- within or adjacent to an AQMA:
    - a change of Light-Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT); and/or
    - a change of Heavy-Duty Vehicle (HDV) flows of more than 25 AADT.
- outside of an AQMA:
    - a change of LDV flows of more than 500 AADT; and/or
    - a change of HDV flows of more than 100 AADT.
- Stage 2: Spatial review with use of satellite imagery to determine whether exposure exists within 200m of an affected road.

7.52 If road traffic flows generated by the Project are not found to exceed any of the screening criteria presented, then effects are considered to be insignificant and can be screened out of further consideration.

Operational Odour Assessment

7.53 The assessment of fugitive odour emissions from the operation of the Proposed Development has been undertaken on the basis of a conceptual model, as per the IAQM odour guidance, that takes into consideration the potential sources, surrounding receptors and the pathway between source and receptor in order to assess the magnitude of risk.

7.54 Specifically, the following aspects are reviewed:

- the type of activities proposed on site including designed-in mitigation measures in order to determine:
    - the potential magnitude of releases in general terms; and
    - the nature of that release.

- the location of receptors in the surrounding area with specific consideration of the type of receptor and therefore their potential sensitivity according to guidance; and
- the pathway between source and receptors incorporating distance between receptors and any mitigating features as well as the frequency of wind conditions likely to result in the dispersion of emissions towards receptors.

7.55 If odour is found to be outside of the screening criteria, then effects are considered to be insignificant and can be screened out of further consideration.

Operational Dust Assessment

7.56 The assessment of fugitive dust emissions from the Proposed Development has been undertaken on the basis of a conceptual model that takes into consideration the potential sources, surrounding receptors and the pathway between source and receptor in order to assess the magnitude of risk.

7.57 Specifically, the following aspects are reviewed:

- the type of activities proposed on site including designed-in mitigation measures in order to determine:
  - the potential magnitude of releases in general terms; and
  - the nature of that release.
- the location of receptors in the surrounding area with specific consideration of the type of receptor and therefore their potential sensitivity to dust; and
- the pathway between source and receptors incorporating buffer distance between receptors and any mitigating features as well as the frequency of wind conditions likely to result in the dispersion of emissions towards receptors.

7.58 If the risk of dust is found to be outside of screening criteria, then effects are considered to be insignificant and can be screened out of further consideration.

Operational Bioaerosols Assessment

7.59 In lieu of sector-specific or planning-specific guidance on the assessment of bioaerosols from Anaerobic Digestion, the EA's regulatory position on the assessment of bioaerosols from composting has been adopted. The EA's current position is that the requirement for assessment of bioaerosols emissions can be screened out where potential source of bioaerosols are located at a distance of 250m or more from sensitive receptors (such as workplaces or dwellings).

7.60 Although it is noted that this guidance was produced in consideration of open-air composting operations, adoption of this approach represents a conservative assessment approach as the Proposed Development is anticipated to have a lesser potential for the release of bioaerosols in comparison to composting operations.

7.61 If receptors are outside of this the screening criteria presented, then effects are considered to be insignificant and can be screened out of further consideration.

Ammonia and Operational CHP Emissions

7.62 In accordance with the EA's AERA guidance and the additional guidance provided by the Air Quality Modelling and Assessment Unit (AQMAU) of the EA, a detailed dispersion modelling assessment has been undertaken to assess the impact of ammonia and CHP emissions from the Proposed Development. The model has been used to predict ground level concentrations for comparison against AQALs, Critical Loads and Critical Levels.

7.63 In relation to human receptors, the significance criteria provided within the EPUK / IAQM guidance document has been applied. This document provides guidance for the consideration of air quality within the land-use planning and development control processes – so is considered appropriate for the purposes of an EIA.

7.64 Whilst considering long-term AQALs, the significance criteria outlined in Table 7-4 has been used. Impacts are defined based upon the resultant total concentration at a specific receptor location, as well as the magnitude of change in relation to respective AQALs.

Table 7-4
Impact Descriptor Matrix for Human Health Receptors: Long Term AQALs

Resultant PEC as a % of the AQAL	PC as % of the AQAL			
	1	2 – 5	6 – 10	>10
<75% of the AQAL	Negligible	Negligible	Minor	Moderate
75 – 95% of the AQAL	Negligible	Minor	Moderate	Moderate
95 – 103% of the AQAL	Minor	Moderate	Moderate	Major
103 – 110% of the AQAL	Moderate	Moderate	Major	Major
>110% of the AQAL	Moderate	Major	Major	Major
(A) Changes <0.5% will be described as Negligible.				

7.65 A change in concentration of less than 0.5% of the long-term AQAL can be described as negligible, irrespective of baseline conditions.

7.66 Further assessment has comprised the consideration of the resultant predicted environmental concentration (PEC) for each relevant scenario relative to the AQAL.

7.67 When considering short-term AQALs, the significance criteria outlined in Table 7-5 have been used. These criteria relate explicitly to the PC as a % of the corresponding AQAL, without considering background concentrations. Impacts can be classed as negligible and thus insignificant if the short

term PC is less than 11% of the AQAL. The PEC has been calculated for each relevant scenario where the short term PC is greater than 11% of the AQAL.

Table 7-5
Impact Descriptor for Receptors: Short Term AQALs

Short Term PC % of AQAL	Magnitude	Definition of Significance
<11	Negligible	Negligible
11-20	Small	Minor
20-50	Medium	Moderate
>51	Large	Major

7.68 In addition to the AERA guidance, the EA's Operational Instruction 66_12 details how air quality impacts on ecological sites should be assessed. This guidance provides risk-based screening criteria to determine whether impacts will have 'no likely significant effects' for European sites, 'no likely damage' for Sites of Special Scientific Interest (SSSIs), or 'no significant pollution' for other sites.

7.69 If PCs are below the relevant thresholds outlined in Table 7-6, impacts can be classed as insignificant, and no further assessment is required.

Table 7-6
Impact Descriptor Matrix for Ecosystem Assessment

Short Term PC % of AQAL	Magnitude	Definition of Significance
European and National Sites	PC <10% Critical Level	PC <1% Critical Level and/or Critical Load PEC <70% Critical Level and/or Critical Load [(a)]
Local Sites and Ancient Woodlands	PC <100% Critical Level	PC <100% Critical Level and/or Critical Load
[(A)] Only assessed if the PC is >1% of Critical Level and/or Critical Load		

Baseline Conditions

Site Setting and Sensitive Receptors

7.70 The Proposed Development comprises two sites; here on in referred to as 'Site 1' and 'Site 2'. Site 1 is located at approximate National Grid Reference (NGR): x564200 y246900, and Site 2 is located at approximate NGR: x564250 y249550. Both Sites are located within the administrative area of WSC and is not located within, or in proximity of, an AQMA.

7.71 Site 1 comprises two arable fields, approximately 9.3ha at Bowsey Field and 3.2ha at Spring Grove Field, accessed off the A1307. Site 1 is surrounded by rural agricultural land with isolated commercial and residential properties. A more densely populated residential area, Three Counties Way, is located approximately 420m to the southeast of Site 1.

7.72 Site 2, approximately 1.5ha arable field along Stour Brook, is surrounded by rural agricultural land with isolated residential properties located along Skippers Lane, located approximately 640m to the south and west.

7.73 A pipeline would connect Site 1 and Site 2, facilitating the transfer of liquid digestate between the Sites.

7.74 There are a number of ecological sites in proximity to the Proposed Development, including Ancient Woodlands (AW) and the Over and Lawn Wood Site of Special Scientific Interest (SSSI).

7.75 Figure 7-1 and Figure 7-2 below present the Proposed Development boundary (red outlines), nearest sensitive human receptors (green triangles) and sensitive ecological receptors (blue shaded areas).

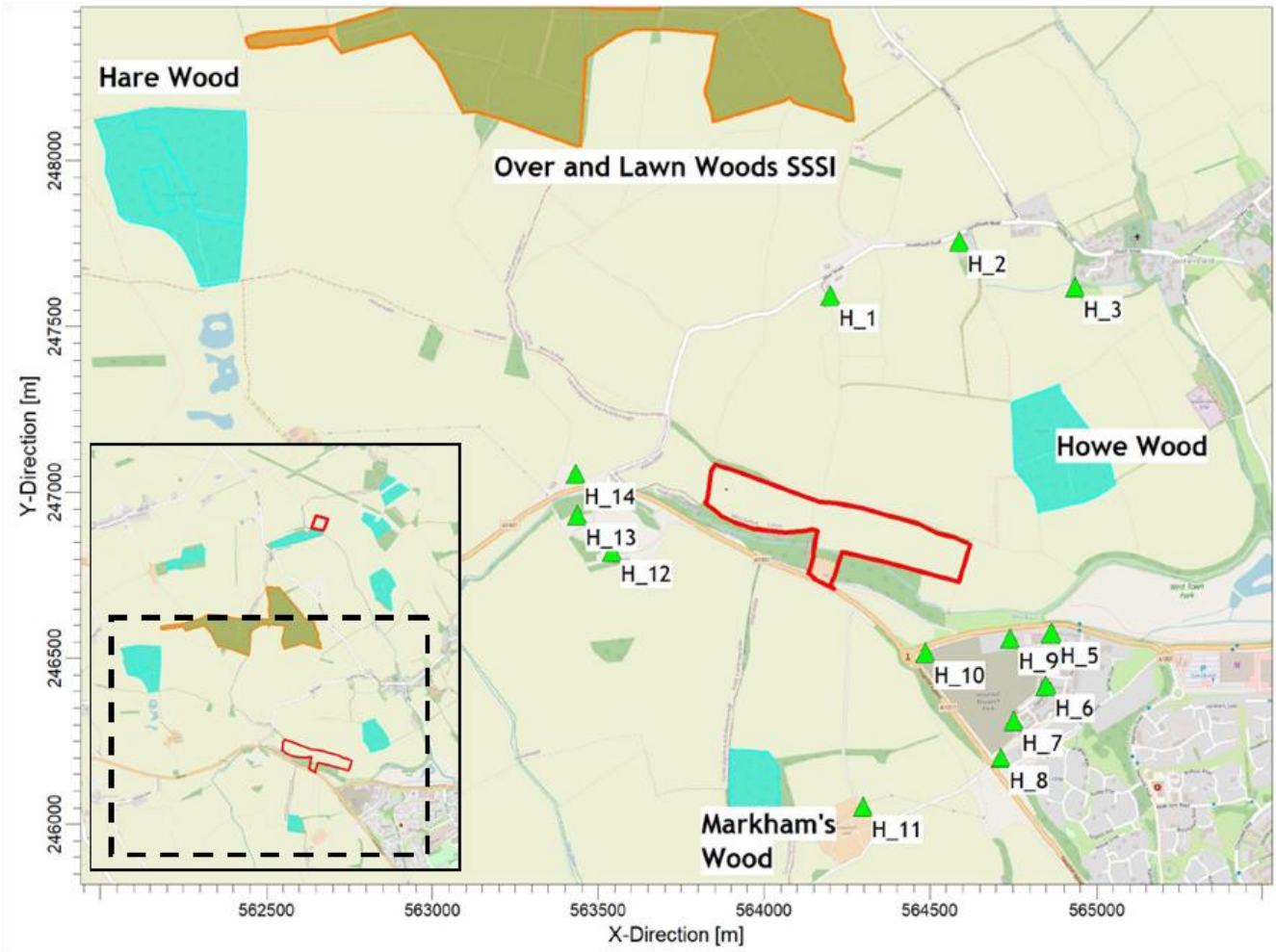

Figure 7-1
Site Setting & Sensitive Receptors

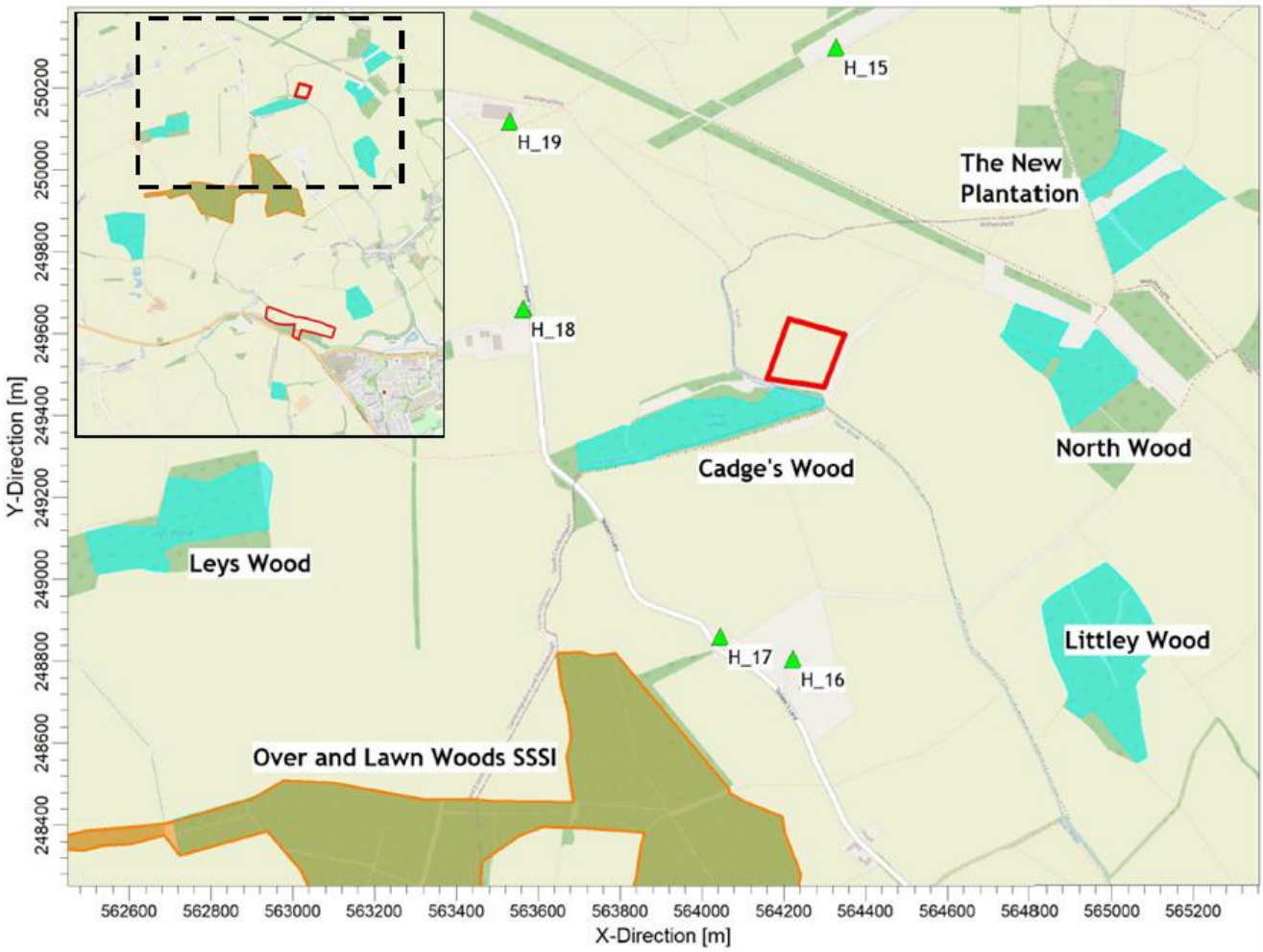

Figure 7-2
Site Setting & Sensitive Receptors

The proposed layout of Site 1 and Site 2 is presented in layout plans 29351/101 Rev H and 29351/600 Rev. C respectively.

Human Receptors

7.76 Receptors in proximity to the Proposed Development with a sensitivity to emissions have been identified and presented in Table 7-7 below. The selection of human receptors has considered the closest receptor locations in each direction to provide a precautionary assessment representative of the general scale of impacts. According to LAQM.TG(22), air quality AQALs should only apply to locations where members of the public may be reasonably likely to be exposed to air pollution for the duration of the relevant AQAL. The sensitivity applied to each receptor (where applicable) has been determined based upon the relevant IAQM guidance.

Table 7-7
Human Receptor Locations

Receptor		In Proximity to Site	Receptor Type	Sensitivity to Odour	Sensitivity to Dust	Direction from Site Boundary	Distance from Site Boundary
H 1	Silver Street	Site 1	Residential	High	High	N	620m
H 2	Horseheath Rd	Site 1	Residential	High	High	N	830m
H 3	Homestall Crescent	Site 1	Residential	High	High	NE	830m
H 4	Queen Street	Site 1	Residential	High	High	E	940m
H 5	Three Counties Way	Site 1	Residential	High	High	SE	320m
H 6	Darwin Walk	Site 1	Residential	High	High	SE	410m
H 7	Darwin Walk	Site 1	Residential	High	High	SE	460m
H 8	Hanchett End	Site 1	Residential	High	High	SSE	550m
H 9	The Flying Shuttle	Site 1	Commercial	Medium	Medium	SE	240m
H 10	The Epicentre Haverhill	Site 1	Commercial	Medium	Medium	SE	210m
H 11	Hatchet Hall Cattery and Kennels	Site 1	Commercial	Medium	Medium	S	690m
H 12	Off A1307	Site 1	Residential	High	High	SW	320m
H 13	Off A1307	Site 1	Residential	High	High	WSW	390m
H 14	Off A1307	Site 1	Residential	High	High	W	400m
H 15	Unnamed road	Site 2	Commercial	Medium	Medium	N	680m
H 16	Skipper's Lane	Site 2	Residential	High	High	S	670m
H 17	Skipper's Lane	Site 2	Residential	High	High	SSW	650m
H 18	Skipper's Lane	Site 2	Residential	High	High	W	630m

Receptor		In Proximity to Site	Receptor Type	Sensitivity to Odour	Sensitivity to Dust	Direction from Site Boundary	Distance from Site Boundary
H 19	Skipper's Lane	Site 2	Residential	High	High	NW	830m

Ecological Receptors

7.77 The AERA Guidance requires that ecological habitats should be screened against relevant standards if they are located within the following set distances from the facility:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Ramsar sites within 10km of the installation; and
- Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) and Ancient Woodland (AW) within 2km of the installation.

7.78 A review using the Magic web-based mapping service[14] and Natural England open data publication[15] was undertaken to identify any designated sites of ecological or nature conservation importance required for consideration within the assessment (relevant sites are as presented in Table 7-8).

Table 7-8
Ecological Receptor Locations

Site	Designation	Within Screening Criteria Distance of	Approximate Distance / Direction from the Site	Most Sensitive Habitat
Howe Wood	AW	Site 1	240m / NE	Broadleaved, Mixed and Yew Woodland
Markhams Wood	AW	Site 1	560m / S	Broadleaved, Mixed and Yew Woodland
Hare Wood	AW	Site 1	1,550m / NE	Broadleaved, Mixed and Yew Woodland
Over and Lawn Woods	SSSI and AW	Site 1 and Site 2	1,030 / N (Site 1) 760m / SE (Site 2)	Broadleaved, Mixed and Yew Woodland

[14]Natural England, www.magic.gov.uk, accessed August 2022.
[15]Natural England, https://naturalengland-defra.opendata.arcgis.com, accessed August 2022

Site	Designation	Within Screening Criteria Distance of	Approximate Distance / Direction from the Site	Most Sensitive Habitat
Littley Wood	AW	Site 1 and Site 2	1,780m / NE (Site 1) 760m / SE	Broadleaved, Mixed and Yew Woodland
Cadge's Wood	AW	Site 2	20m / S and SW	Broadleaved, Mixed and Yew Woodland
North Wood	AW	Site 2	380m / E	Broadleaved, Mixed and Yew Woodland
New Plantation	AW	Site 2	670m / ENE	Broadleaved, Mixed and Yew Woodland
Leys Wood	AW	Site 2	1,250, WSW	Broadleaved, Mixed and Yew Woodland

Ambient Air Quality

7.79 Monitoring data collected prior to the COVID-19 pandemic (i.e. pre-2020) has been used to characterise the baseline environment, as pollutant concentrations monitored during 2020 and 2021 are expected to be atypical, and not representative of the local environment. This approach is in line with the IAQM position statement, which recommends the following:

"If you are carrying out an air quality study that includes validation against monitoring data, use 2019 monitoring data as the last typical year."

7.80 The latest publicly available Annual Status Report (ASR) for WSC at the time of writing is the 2021 ASR[16] and therefore the data presented for 2020 were potentially impacted by the COVID-19 pandemic. As such, the 2020 data have not been presented and has been discounted from further consideration.

Local Air Quality Management

7.81 A review of the 2021 ASR indicates that air quality, in regard to NO_2 concentrations, is generally good across the WSC administrative areas. No exceedances of the current Air Quality Objectives have been identified across the administrative area.

7.82 WSC have declared three AQMAs for exceedences of the annual mean NO_2 objective; the Newmarket AQMA, Great Barton and Sicklesmere Road AQMA and the Bury St Edmunds AQMA.

[16] 2021 Air Quality Annual Status Report (ASR), West Suffolk Council, July 2021.

These are located at a distance of 15km or more from the Proposed Development. Therefore, these AQMAs have not been considered further within this study.

Passive Diffusion Tube Monitoring

7.83 Passive diffusion tube monitoring is currently undertaken by WSC at numerous locations throughout the Council's administrative area as part of their commitment to LAQM. The diffusion tubes are located in areas which are deemed to require further assessment of NO_2 concentrations. The majority of monitoring locations are located within the urban areas, including Newmarket and Bury St Edmunds Town Centres (within the corresponding AQMAs), and are therefore not representative of the site locale, which is rural.

7.84 A small number of monitoring locations are located within Haverhill Town Centre, approximately 2.5km to the east of the Proposed Development at the closest point. The monitored NO_2 concentrations at these monitoring locations are presented in Table 7-9 below.

Table 7-9
NO_2 Diffusion Tube Monitoring Results

Monitoring Location	Site Classification	Approximate Distance / Direction from the Site	Annual Mean Concentration (µg/m^3)	
			2018	2019
HH1	Suburban (A)	4.3km / east	12.3	12.1
HH2	Roadside (B)	2.9km / east	28.8	28.5
HH3	Roadside (B)	2.5km / east	33.8	31.2
HH5	Roadside (B)	2.5km / east	33.1	30.0

Notes:
(A) A location type situated in a residential area on the outskirts of a town or city.
(B) A site sampling typically within one to five metres of the kerb of a busy road (although distance can be up to 15 m from the kerb in some cases).

7.85 As presented in Table 7-9 above, recorded annual mean NO_2 concentrations are well below the annual mean NO_2 AQAL, and have decreased between 2018 and 2019.

Automatic Air Quality Monitoring

7.86 WSC operate a number of automatic monitoring stations, however all of these monitoring stations are located within an AQMA and are therefore not considered representative of the Site locale.

7.87 NO_2 and SO_2 concentrations are monitored nationally through the 'Automatic Urban and Rural Network' (AURN) and the 'Acid Gas and Aerosol Network'. These networks are used to quantify temporal and spatial changes in concentrations of these pollutants on a long-term basis.

7.88 The closest AURN monitoring stations are 'Cambridge' and 'Wicken Fen', located approximately 22km northwest and 24km north of the Site respectively. The Cambridge monitor is set within an 'Urban Traffic' monitoring location, and is therefore not considered representative of the Site locale and has not been considered further. The Wicken Fen monitoring station is also part of the Acid Gas and Aerosol Network and monitors SO_2 concentrations.

7.89 The monitored NO_2 concentrations are presented in Table 7-10 and SO_2 concentrations in Table 7-11.

Table 7-10
Automatic NO_2 Monitoring Results

Monitoring Station	Monitoring Period	Site Classification	Annual Mean NO_2 Concentration (µg/m³)	Number of Hours >200µg/m³	Data Capture (%)
Wicken Fen (UKA00362)	01/01/2019 to 31/12/2019	Rural background	8.5	0	93.8

Table 7-11
Automatic SO_2 Monitoring Results

Monitoring Station	Monitoring Period	Average Annual SO_2 Concentration (µg/m³)	Number of 15-minute Means >266µg/m³	Number of 1-hour Means >350µg/m³	Number of 24-hour Means >125µg/m³	Data Capture (%)
Wicken Fen (UKA00362)	01/01/2019 to 31/12/2019	0.94	0	0	0	68.3

7.90 The recorded annual mean NO_2 and SO_2 concentrations are below the relevant AQALs.

Defra Modelled Background Concentrations and Projections

7.91 Predictions of background pollutant concentrations on a 1km-by-1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air

quality[17]. The maximum mapped background concentrations of NO_2, PM_{10} and $PM_{2.5}$ in the Site locale, based upon the 2018 base year Defra update and projected to 2022, were downloaded for the grid squares containing the Sites and relevant receptors, as presented within Table 7-12.

Table 7-12
Background Concentrations for Study Area

Pollutant	2022 Mapped Background Concentration (µg/m^3)
NO_2	7.9
PM_{10}	16.4
$PM_{2.5}$	9.3

7.92 The Defra background predictions indicate annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQALs across the study area.

Monitoring of Other Pollutants

7.93 Ammonia is not monitored as part of the LAQM regime, therefore they do not form part of the monitoring undertaken by WSC.

7.94 Ammonia is however monitored nationally through the 'National Ammonia Monitoring Network'. This network is used to quantify temporal and spatial changes in NH_3 concentrations on a long-term basis. The monitoring results from the closest monitoring sites within these networks are presented in Table 7-13.

[17] Background mapping data for local authorities – http://uk-air.defra.gov.uk/data/laqm-background-home, accessed November 2022.

Table 7-13
Automatic NH_3 Monitoring Results

Monitoring Station	Monitoring Period	Site Classification	2020 Annual Mean NH_3 Concentration ($\mu g/m^3$)
Stanford 2 (A) (UKA00476)	01/01/2020 to 31/12/2020	Rural background	2.15

Table note:
(A) 2020 data presented, as data for 2021 was incomplete (approximately 50% data capture).

Baseline Conditions at Human Receptors

7.95 The background concentrations in Table 7-14 have been applied in this Air Quality Assessment. In general, a conservative approach has been applied with use of high background concentrations as a worst-case scenario.

Table 7-14
Applied Background Concentrations

Pollutant	Averaging Period	Concentration ($\mu g/m^3$)	Data Source
NO_2	Annual Mean	8.5	2019 annual mean concentration monitored at the Wicken Fen monitoring station
	1-hour Mean	17.0	2 x the above, following the H1 guidance note
NH_3	Annual Mean	2.15	2020 annual mean concentration monitored at the Stanford 2 monitoring station
	1-hour Mean	4.30	2 x the above, following the H1 guidance note

Baseline Conditions at Ecological Receptors

7.96 The Air Pollution Information System (APIS) website[18], is a support tool used in the assessment of potential effects of air pollutants upon habitats and species - developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology. The APIS support tool has subsequently been used to provide information on background pollutant concentrations, current deposition rates and C_{Lo}'s for nutrient nitrogen (Table 7-15) and C_{Lo} functions for acidity (Table 7-16).

[18] http://www.apis.ac.uk/, accessed January 2023.

Table 7-15
Critical Levels and Current Loads

Site	APIS Critical Load Class (most sensitive)	NO_x Annual Mean ($\mu g/m^3$)	SO_2 Annual Mean ($\mu g/m^3$)	NH_3 Annual Mean ($\mu g/m^3$)	Critical Load Range (kg N/ha/yr)	Critical Load Applied in Assessment (kg N/ha/yr)	Current Load (kg N/ha/yr)
Howe Wood (AW) (A)	Broad-leaved, mixed and yew woodland	9.1	0.68	1.97	10-20	10	32.8
Markhams Wood (AW) (B)	Broad-leaved, mixed and yew woodland	9.7	0.73	1.97	10-20	10	32.8
Hare Wood (AW) (C)	Broad-leaved, mixed and yew woodland	9.1	0.75	1.97	10-20	10	32.8
Over and Lawn Woods (SSSI, AW)	Broad-leaved, mixed and yew woodland	8.9	0.73	1.97	15-20	15	32.8
Littley Wood (AW) (D)	Broad-leaved, mixed and yew woodland	8.9	0.66	1.97	10-20	10	32.8
Cadge's Wood (AW) (E)	Broad-leaved, mixed and yew woodland	8.9	0.75	1.97	10-20	10	32.8
North Wood (AW) (F)	Broad-leaved, mixed and yew woodland	8.8	0.75	1.97	10-20	10	32.8
New Plantation (AW) (G)	Broad-leaved, mixed and yew woodland	8.9	0.75	1.97	10-20	10	32.8
Leys Wood (AW) (H)	Broad-leaved, mixed and yew woodland	9.0	0.75	1.97	10-20	10	32.8

Table note:
Defined by APIS for the following grid references: (A) x564761, y247077, (B) x564023, y246200, (C) x562402, y247663, (D) x564945, y248610, (E) x563990, y249376, (F) x564900, y249530, (G) x565070, y249920 and (H) x562730, y249140.

Table 7-16
Acid Critical Load Functions and Current Loads

Site	APIS Critical Load Class (most sensitive)	Critical Load Function (k_{eq}/ha/yr)			Current Load (k_{eq}/ha/yr)	
		CLmaxS	CLminN	CLmaxN	N	S
Markhams Wood (AW) (A)	Broad-leaved, mixed and yew woodland	10.786	0.214	11.000	2.45	0.15
Howe Wood (AW) (B)	Broad-leaved, mixed and yew woodland	10.786	0.214	11.000	2.45	0.15
Hare Wood (AW) (C)	Broad-leaved, mixed and yew woodland	10.790	0.214	11.004	2.45	0.15
Over and Lawn Woods (SSSI / AW)	Broad-leaved, mixed and yew woodland	10.792	0.214	11.006	2.4	0.2
Littley Wood (AW) (D)	Broad-leaved, mixed and yew woodland	10.787	0.214	11.001	2.45	0.15
Cadge's Wood (AW) (E)	Broad-leaved, mixed and yew woodland	10.789	0.214	11.003	2.45	0.15
North Wood (AW) (F)	Broad-leaved, mixed and yew woodland	10.789	0.214	11.003	2.45	0.15
New Plantation (AW) (G)	Broad-leaved, mixed and yew woodland	10.806	0.214	11.020	2.42	0.17
Leys Wood (AW) (H)	Broad-leaved, mixed and yew woodland	10.791	0.214	11.005	2.45	0.15

Table note:
Defined by APIS for the following grid references: (A) x564023, y246200, (B) x564761, y247077, (C) x562402, y247663, (D) x564945, y248610, (E) x563990, y249376, (F) x564900, y249530, (G) x565070, y249920 and (H) x562730, y249140.

Meteorological Conditions

7.97 The most important climatic parameters governing the release and dispersal of fugitive emissions from the Site are:

- wind direction which determines the broad direction of dispersal; and
- wind speed will affect ground level emissions by increasing the initial dilution of pollutants in the emission.

7.98 The nearest meteorological recording station to the Proposed Development is the Cambridge meteorological recording station, located approximately 19km to the northwest. However in consideration of the surrounding land use (urban) and elevation of the Cambridge meteorological recording station (15m) in comparison to the Proposed Development (85-100m elevation, rural area), this station was not considered representative of the Site locale.

7.99 The Andrewsfield meteorological recording station is the next closest to the Proposed Development (located 24km to the south), located in a setting more similar to that of the Proposed Development (80m elevation, rural). A windrose from the Andrewsfield meteorological recording station, showing the frequency of wind speed and direction, used in the assessment is provided in Figure 7-3 below. The windrose shows winds from the south-west are most prevalent.

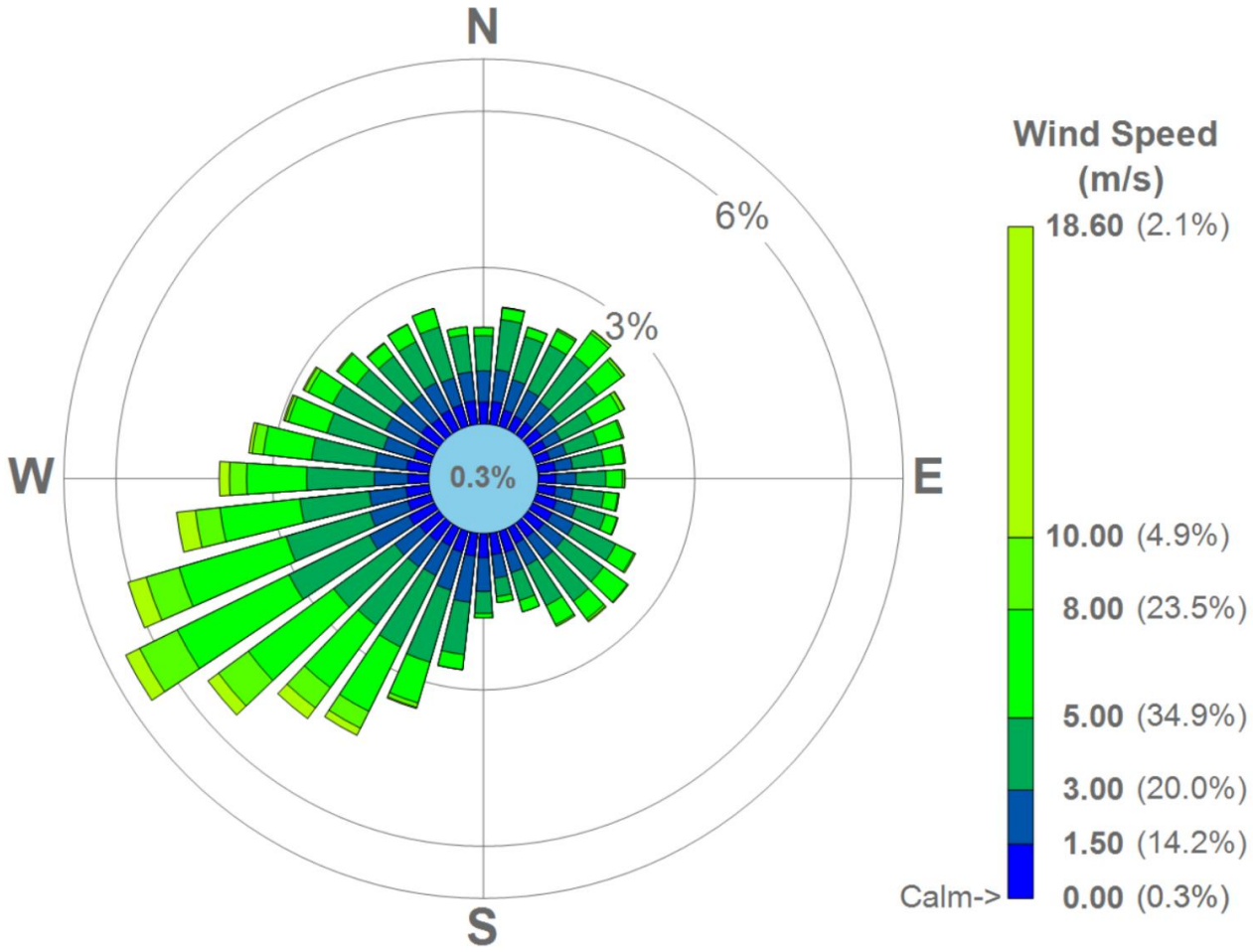

Figure 7-3
Andrewsfield Recording Station Windrose (2017 - 2021 average)

7.100 One of the most important meteorological factors to consider when undertaking an assessment of odour, bioaerosols or dust is low wind speeds (winds below 5m/s). During periods of low wind

speeds, the dispersion of airborne particles/odours is much less effective. Low wind speeds (below 5m/s) are relatively frequent at approximately 35% of hours in an 'average' year. Moderate to high winds (above 5m/s) occur for the remaining hours (approximately 65%) in an 'average' year, predominantly from the southwest.

7.101 Rainfall is also an important climatological parameter supressing the generation of dust. Rainfall greater than 0.2mm per day is considered sufficient to suppress dust emissions.

7.102 Relevant rainfall data applicable to the Site has been obtained from the Meteorological Office website[19]. Utilising the map of climate averages from the met office, the number of days with rainfall greater than 0.2mm is between 170 and 180 days per year (~48%).

Existing Emissions Sources

Existing Sources of Odour, Dust and Ammonia

7.103 A review of baseline conditions with respect to odours in the surrounding area has been undertaken by reviewing aerial imagery. Through review of aerial imagery the only significant sources of odours, dust and ammonia identified is the existing agricultural activity in the area (i.e. working of agricultural land). However, in consideration of the likely infrequent nature of these activities, this potential source has not been considered further within this assessment.

Bioaerosols

7.104 Offsite activities and the local environments can affect localised concentrations of bioaerosols in ambient air. Therefore it should be considered that the nearby agricultural and wooded areas can represent a significant potential source of bioaerosols.

Assessments of Effects

Full details of this assessment are presented in Appendix 7.A: Air Quality Assessment with a summary of the findings provided below.

Construction Dust Assessment

Site 1

7.105 As presented in Figure 7-4 below, there are human receptors within 350m to the southeast and southwest of Site 1. There are no sensitive ecological sites within 50m of the boundary, or within 50m of the route used by construction vehicles on the public highway up to 200 m from the site

[19] Meteorological Office, UK Climate Averages https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcjs3tzpf. Accessed June 2022.

entrance(s). As such, an assessment considering only human receptors is required (no assessment of ecological receptors is required).

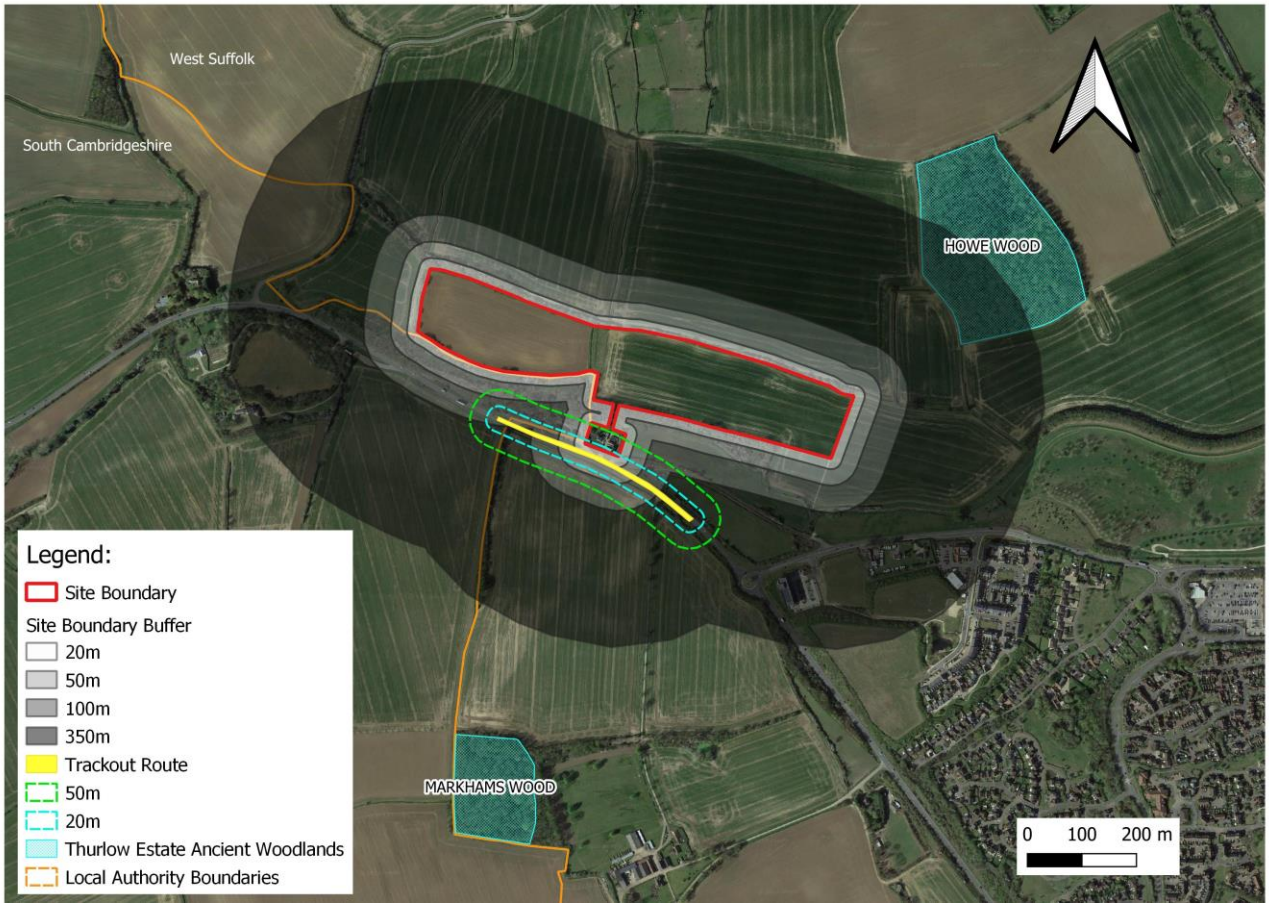

Figure 7-4
Construction Dust Screening Distances – Site 1

7.106 The potential dust emission magnitude for each activity has been assessed and assigned on the basis of the criteria presented in the IAQM guidance, as presented in Appendix 7.A: Air Quality Assessment.

7.107 The assessment concludes that Site 1 is predicted to comprise at worst a 'Low' risk in relation to dust soiling and human health effects at nearby sensitive receptors. Furthermore, any potential dust effects during the construction phase would be temporary in nature and may only arise at particular times (i.e., certain activities and/or meteorological conditions).

7.108 The specific mitigation measures proposed are presented in Appendix 7.A: Air Quality Assessment.

Site 2

7.109 As presented in Figure 7-5 below, there are no human receptors within 350m of Site 2. There is a sensitive ecological site (Cadge's Wood) within 50m of the boundary and within 50m of the route used by construction vehicles on the public highway up to 200 m from the site entrance. As such, an assessment considering only ecological receptors is required (no assessment of human receptors is required).

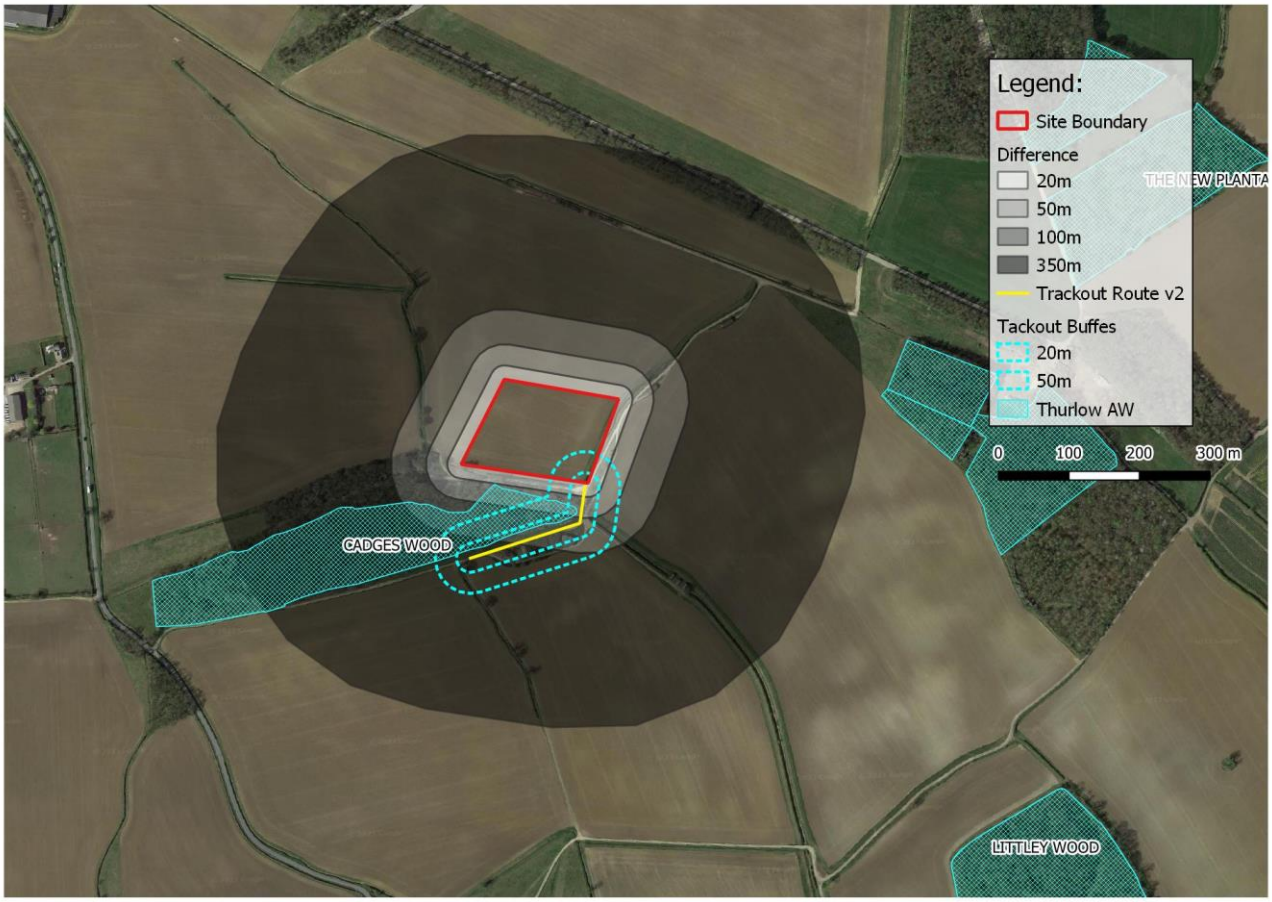

Figure 7-5
Construction Dust Screening Distances – Site 2

7.110 The potential dust emission magnitude for each activity has been assessed and assigned on the basis of the criteria presented in the IAQM guidance, as presented in Appendix 7.A: Air Quality Assessment.

7.111 The assessment concludes that Site 2 is predicted to comprise at worst a 'Low' risk in relation to dust effects at nearby sensitive ecological receptors. Furthermore, any potential dust effects during the construction phase would be temporary in nature and may only arise at particular times (i.e., certain activities and/or meteorological conditions).

7.112 The specific mitigation measures proposed are presented in Appendix 7.A: Air Quality Assessment.

Pipeline

7.113 As presented in Figure 7-6 below, there are human receptors within 350m of the Pipeline Route, but no sensitive ecological sites within 50m of the Pipeline Route. As such, an assessment considering only human receptors is required (no assessment of ecological receptors is required).

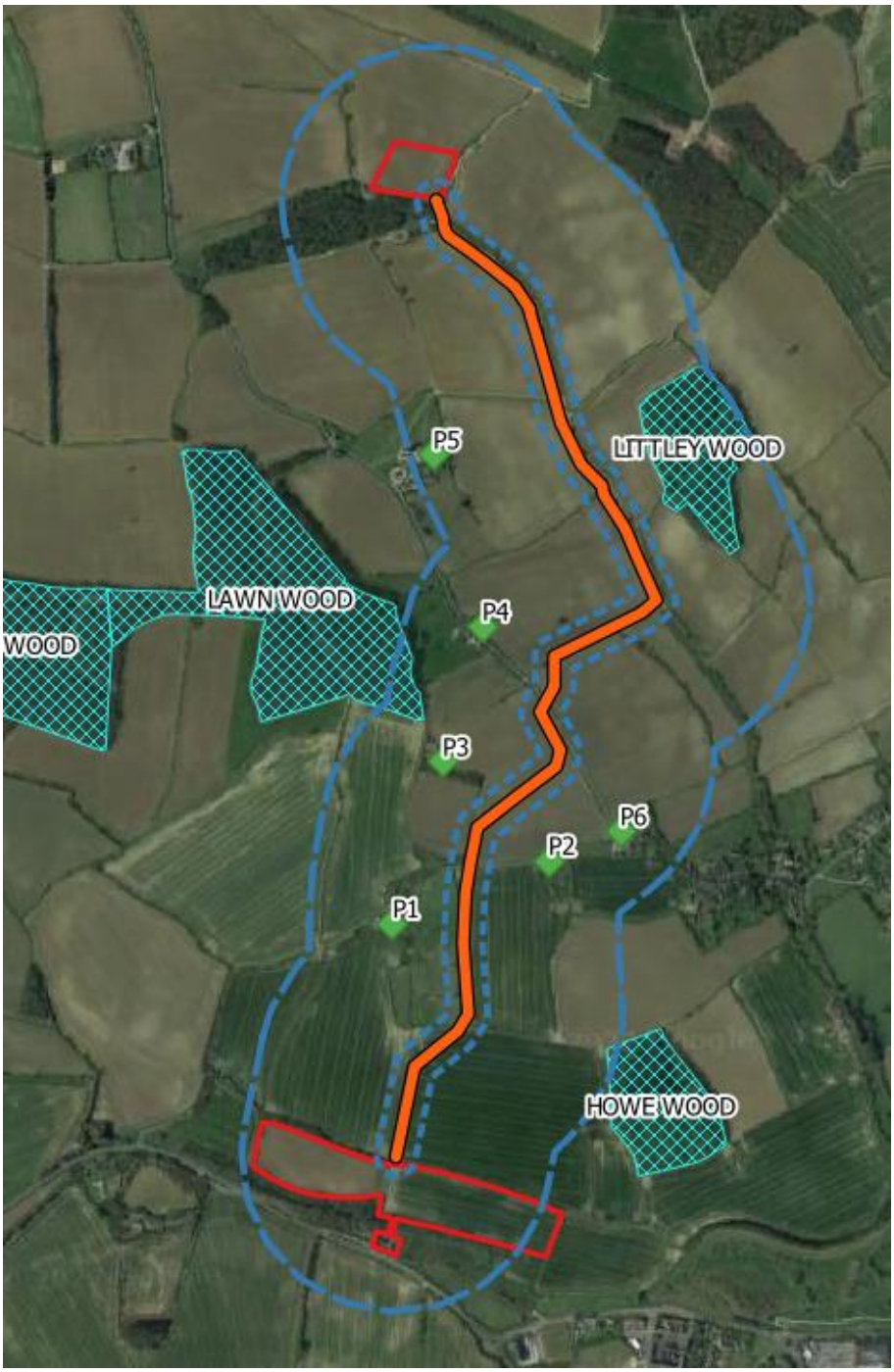

Figure 7-6
Construction Dust Screening Distances – Pipeline

7.114 The potential dust emission magnitude for each activity has been assessed and assigned on the basis of the criteria presented in the IAQM guidance, as presented in Appendix 7.B: Pipeline Air Quality Assessment.

7.115 The assessment concludes that the Pipeline is predicted to comprise at worst a 'Low' risk in relation to dust effects at nearby sensitive human receptors. Furthermore, any potential dust effects during the construction phase would be temporary in nature and may only arise at particular times (i.e., certain activities and/or meteorological conditions).

7.116 The specific mitigation measures proposed are presented in Appendix 7.B: Pipeline Air Quality Assessment.

Construction Traffic Screening

7.117 Construction of the Proposed Development would result in the temporary employment of contractors at the Site. The associated increase in LDVs (from contractors commuting to work) has been considered through adoption of a suitably conservative assessment approach; assuming that all contractors travel to the Site via car (without carpooling) every day.

7.118 In consideration of the size and nature of the construction operations, the anticipated number of LDVs movements to/from the Site each day (i.e. construction staff commuting and small deliveries) is anticipated to be fewer than 250, as AADT.

7.119 The construction of the Proposed Development would result in import and exports of goods and materials to/from the Site via road. In consideration of the size and nature of the construction operations, the anticipated number of HDVs movements to/from the Site each day is anticipated to be 16, as AADT (equating to approximately 6,000 movements per year).

7.120 Construction road traffic vehicle flows screen are below the screening criteria. Therefore, in accordance with the EPUK & IAQM Guidance, the 'impacts [on air quality from construction phase trips] can be considered as having an insignificant effect'.

Operational Odour Assessment

Site 1

7.121 The specific potential odour sources identified at Site 1 are presented in Appendix 7.A: Air Quality Assessment.

7.122 There are no significant existing sources of odour in the site locale.

7.123 In review of the specific potential odour sources identified, adopting a suitably cautious approach, the combined source odour potential of Site 1 is considered to be 'medium'.

7.124 The pathway effectiveness to the sensitive receptors was determined through a combination of the distance to the emission source, the frequency of winds with the potential to disperse odour towards that receptor and the effectiveness of dispersion/dilution of odours from the sources identified at Site 1. The likely magnitude of odour effect has been determined by consideration of

the source odour potential and the pathway effectiveness. Full details of this assessment are presented in Appendix 7.A: Air Quality Assessment.

7.125 The likely odour effect is predicted to be 'negligible' at all nearby sensitive receptors.

7.126 The likely significance of effects as a result of odours from Site 1 can therefore be considered 'not significant' at all nearby sensitive receptors, in accordance with the IAQM guidance

Site 2

7.127 The specific potential odour sources identified at Site 2 are presented in Appendix 7.A: Air Quality Assessment.

7.128 There are no significant existing sources of odour in the site locale.

7.129 In review of the specific potential odour sources identified, adopting a suitably cautious approach, the combined source odour potential of Site 2 is considered to be 'small'.

7.130 The pathway effectiveness to the sensitive receptors was determined through a combination of the distance to the emission source, the frequency of winds with the potential to disperse odour towards that receptor and the effectiveness of dispersion/dilution of odours from the sources identified at Site 2. The likely magnitude of odour effect has been determined by consideration of the source odour potential and the pathway effectiveness. Full details of this assessment are presented in Appendix 7.A: Air Quality Assessment.

7.131 The likely odour effect is predicted to be 'negligible' at all nearby sensitive receptors.

7.132 The likely significance of effects as a result of odours from Site 2 can therefore be considered 'not significant' at all nearby sensitive receptors, in accordance with the IAQM guidance.

Operational Dust Assessment

Site 1

7.133 There are human receptors with a sensitivity to dust soiling within 250m of Site 1. There are no sensitive ecological receptors within 250m of the Site. Therefore, further assessment for the potential impact of deposited dust and PM_{10} on human receptors is required.

7.134 The specific potential dust sources identified at Site 1 are presented in Appendix 7.A: Air Quality Assessment.

7.135 There are no significant existing sources of dust in the site locale.

7.136 In review of the potential dust sources identified, adopting a suitably cautious approach, the combined source emission of Site 2 is considered to be 'small'.

7.137 The likely magnitude of dust effects has been determined by consideration of the residual source emission and the pathway effectiveness. Full details of this assessment are presented in Appendix 7.A: Air Quality Assessment.

7.138 The likely dust effect is predicted to be 'negligible' at all sensitive receptors identified.

7.139 The likely significance of effects as a result of dust generation from Site 1 is therefore considered to be 'not significant' at all identified receptor locations in accordance with the IAQM guidance.

Site 2

7.140 There are no significant sources of dust proposed at Site 2, as Site operations comprise the storage and export of liquid digestate only.

7.141 As such, the likely significance of effects as a result of dust generation from Site 2 can therefore be considered 'not significant'.

Operational Traffic Assessment

7.142 It is anticipated that the Proposed Development would result in the following approximate daily trip generation:

- 10 LDV movements (as AADT) – due to the employment of 5 staff at the Site; and
- 54 HDV trips (as AADT) - calculated from the total anticipated number of HDVs arriving/departing based on annual tonnages processed – daily trips would fluctuate on a seasonal basis (i.e., during the harvest season when sileage is brought in from the fields).

7.143 Based upon the trip generation details outlined above, the predicted number of additional development trips are below the relevant criteria for a site situated outside an AQMA for both LDVs and HDVs (500 LDVs and 100 HDVs AADT). Therefore, in accordance with the EPUK & IAQM Guidance, the 'impacts [on air quality from operational phase trips] can be considered as having an insignificant effect'.

Operational Bioaerosols Screening

7.144 The Environment Agency's current position is that the requirement for assessment of bioaerosols emissions can be screened out where potential sources of bioaerosols are located at a distance of 250m or more from sensitive receptors (such as workplaces or dwellings).

7.145 There are no sensitive human receptors within 250m of the potential bioaerosol emission sources at Site 1 or Site 2. Therefore, further consideration of bioaerosols emissions is not required.

Operational CHP Emissions Assessment

7.146 Full details of the emissions dispersion modelling assessment undertaken are detailed in Appendix 7.A: Air Quality Assessment. A summary is provided below.

7.147 Generation of heat and power for the proposed operations would be facilitated by two CHP engines:

- CHP 1: fuelled on biogas, producing 0.6 MW_e; and
- CHP 2: fuelled on natural gas, producing 1.5 MW_e.

7.148 The emission parameters for the two CHPs have been determined in reference to the manufacturer's datasheet. The emission concentrations applied are compliant with EP Regulations.

7.149 Predicted long-term NO_2 impacts at the modelled receptor can be described as 'negligible'. Predicted short-term NO_2 impacts at the modelled receptor can be described as 'small' (PC 10-20% of AQAL) at receptor R10 and 'negligible' (PC <10% of AQAL) at all other receptors identified. The NO_2 AQAL is not predicted to be exceeded any of the receptor locations.

7.150 Predicted long-term and short-term SO_2 impacts at the modelled receptor can be described as 'negligible'. The SO_2 AQAL is not predicted to be exceeded any of the receptor locations.

7.151 Therefore, the overall effect on air quality at human receptors as a result of NO_2 and SO_2 emissions is considered 'not significant'.

7.152 The results of the assessment of impacts on C_{Le}'s are:

- the short-term NO_X PC is below 10% of the short-term C_{Le} at the Over and Lawn Woods SSSI;
- the NO_X and SO_2 PC is below 1% of the long-term C_{Le} at the Over and Lawn Woods SSSI; and
- the NO_X and SO_2 PC is below 100% of the C_{Le} at the surrounding Ancient Woodlands.

7.153 Assessment of NO_2 and SO_2 emissions upon critical loads at the sensitive ecological receptors identified is presented inclusive of contributions from ammonia within the section below.

7.154 Therefore the Proposed Development is considered to cause 'no likely damage' to the SSSI and 'no significant pollution' at the surrounding Ancient Woodlands.

Operational Ammonia Impact Assessment

7.155 The potential sources of ammonia emissions from the proposed site operations comprise the following:

- poultry litter and FYM feedstocks;
- feed hoppers;

- liquid digestate; and
- solid digestate.

7.156 Ammonia emissions from the feedstocks, liquid digestate and solid digestate have been derived in application of the methodology outlined in section 5.B.2 of the EMEP Air Pollutant Emission Inventory Guidebook

7.157 The assumptions applied, calculated emissions and full details of the dispersion modelling assessment undertaken are presented in Appendix 7.A: Air Quality Assessment.

7.158 Predicted long-term and short-term NH_3 impacts at the modelled receptor can be described as 'negligible'. The NH_3 AQAL is not predicted to be exceeded any of the receptor locations.

7.159 The results of the assessment of impacts on C_{Le}'s are:

- the NH_3 PC is below 1% of the long-term C_{Le} at the Over and Lawn Woods SSSI; and
- the NH_3 PC is below 100% of the C_{Le} at the surrounding Ancient Woodlands.

7.160 The results of the assessment of impacts on C_{Lo}'s are:

- the nitrogen and acid deposition PC does not exceed 100% of the C_{Lo} at the surrounding Ancient Woodlands; and
- the nitrogen and acid deposition PC does not exceed 1% of the C_{Lo} at the Over and Lawn Woods SSSI.

7.161 Therefore the Proposed Development is considered to cause 'no likely damage' to the SSSI and 'no significant pollution' at the surrounding Ancient Woodlands.

Operational Phase Residual Effects

Construction Stage

7.162 Following the effective implementation of mitigation measures set out in Appendix 7.A: Air Quality Assessment, the residual effects associated with dust/PM_{10} generated by the construction activities on sensitive receptors will be not significant.

Operational Stage

7.163 The operational/containment measures proposed, which have been considered within this assessment, are outlined below:

- covering (sheeting) of silage within the clamps;
- poultry litter and FYM to be enclosed within the Manure Shed, with air extracted to a dedicated abatement system;
- the digestate lagoons to be covered;
- the Separator building to be enclosed (passively ventilated); and

- a site management system to ensure routine site cleaning measures are undertaken (i.e. spillages cleared and not left in situ.

Conclusions

7.164 This chapter has considered the potential for the proposed development to impact upon local air quality environment near the application site, at the identified sensitive locations. This chapter has described the scope, relevant legislation, assessment methodology and the baseline conditions existing at the site and its surroundings. It has considered any potential significant environmental effects the proposed development would have on this baseline environment.

7.165 The construction phase assessment has concluded that the construction of the Proposed Development would result in a 'not significant' risk of impacts.

7.166 The operational phase assessment has concluded that the Proposed Development would result in a 'not significant' effect at human receptor locations with regard to odour, dust, ammonia, CHP and traffic emissions bioaerosols emissions screen out of the need for further assessment according to EA guidelines. With regard to ecological receptors the process emissions are considered to cause 'no likely damage' to the Over and Lawn Woods SSSI and 'no significant pollution' at the surrounding Ancient Woodlands.