# TECHNICAL NOTE

**Job Name:** Knoxbridge Farm

**Job No:** 47934

**Note No:** TN_001_Rev2

**Date:** 26th October 2020 (updated 27th January 2021)

**Prepared By:** L. Smart & P. Branchflower

**Subject:** **Knoxbridge Farm AD Plant - Environmental Permit Air Emission Risk Assessment**

## 1. INTRODUCTION

1.1. The Knoxbridge Farm Anaerobic Digestion (AD) facility is located adjacent to an existing egg production unit at Knoxbridge Farm, Cranbrook Road, Kent. The AD facility lies approximately 550m to the north east of the village of Knoxbridge and 1.5 km south east of the town of Staplehurst.

1.2. Poultry manure will be transported to the AD facility from the existing poultry sheds via a covered conveyer system and by tractor and covered trailer from neighbouring farms. The AD facility will produce biogas from the poultry manure feedstock which is then utilised in a gas engine to generate electricity and heat for onsite consumption, and for upgrading to biomethane for export to the national grid.

1.3. In order to inform the Environmental Permit (EP) application for the AD facility, an 'Air Emissions Risk Assessment' (AERA) is required by the Environment Agency (EA).

1.4. The approach to, and findings of the AERA for the AD facility are summarised in this technical note.

## 2. APPROACH

2.1. The assessment has been undertaken in accordance with the principles of Environment Agency (EA) AERA guidance[1] whereby potential sources of emissions to air have been identified, emissions of potential pollutants quantified, and their potential impact at sensitive receptor locations (human and ecological) determined.

2.2. The purpose of the AERA guidance is to assist operators for all types of permitted facilities to assess risks to the environment and human health when applying for a permit under the EP Regulations.

**Identification of Receptors**

2.3. Details of sensitive receptors are provided in **Table 2-1** below and shown in **Figure 1**.

2.4. For human receptors the AERA considers impacts at the closest residential properties to the AD facility.

2.5. For ecological receptors, the AERA guidance requires that impacts 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.

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[1] Environment Agency (2016). 'Air Emission Risk Assessment for your Environmental Permit'.

2.6. For ecological receptors, the closest point within the habitat to the Site has been selected.

Table 2-1 Identified Receptors

| Receptor | X | Y |
|---|---|---|
| **Human Receptors** | | |
| Little Wadd Stables | 579786 | 141009 |
| Knoxbridge Barn | 578946 | 140803 |
| Rose Cottage Farm Barn | 579119 | 140759 |
| Iden Grange | 578812 | 141675 |
| **Ecological Receptors** | | |
| Grand Shore Wood Ancient Woodland | 579772 | 140603 |
| Duck Pit Wood Ancient Woodland | 580033 | 140881 |
| Maplehurst Farm Wood Ancient Woodland | 579315 | 141624 |
| Tollhurst Wood Ancient Woodland | 578544 | 140340 |
| Unnamed Ancient Woodland 1 | 577850 | 140826 |
| Unnamed Ancient Woodland 2 | 577867 | 141549 |
| Gooseberry Wood Ancient Woodland | 577996 | 141931 |
| Sissinghurst Park Wood SSSI | 580072 | 139292 |

**Quantification of Emissions**

2.7. The flue gas emissions of oxides of nitrogen (NOx) and sulphur dioxide ($SO_2$) to air from the Combined Heat and Power (CHP) unit, boilers and biogas flare have been calculated based on manufacturers design data and applicable Emission Limit Values (ELVs) and assuming all plant is operating at full capacity 24/7 (which is a worst case assumption, particularly for the biogas flare).

2.8. The flue gas emissions of ammonia ($NH_3$) and odour to air from the stacks serving the ammonia scrubber and biogas upgrade plant, have been calculated based on manufacturers design data and applicable ELVs assuming all plant are operating at full capacity 24/7 (which is a worst case assumption).

2.9. The potential fugitive emissions of NH3 and odour resulting from the feedstock and digestate storage areas have been calculated from published data reported in the Simple Calculation of Atmospheric Impact Limits(SCAIL) Agriculture User Guide[2] assuming all storage areas are full 24/7 (which is a worst case assumption as the quantities will vary significantly below this maximum quantity).

**Relevant Environmental Assessment Levels**

2.10. The Environmental Assessment Levels (EALs) applied in this assessment for protection of human receptors are provided in **Table 2-2**.

Table 2-2 Applied EALs ($\mu g/m^3$)

| Pollutant | | Annual EAL | Short Term EAL |
|---|---|---|---|
| Nitrogen dioxide | $NO_2$ | 40 | 200 (1-hour) not to be exceeded more than 18 times per year |
| Sulphur dioxide | $SO_2$ | None | 266 (15-minute) not to be exceeded more than 35 times per year |
| | | | 350 (1-hour) not to be exceeded more than 24 times per year |
| | | | 125 (24-hour) not to be exceeded more than 3 times per year |

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[2] Sniffer (2014). 'SCAIL Agriculture User Guide'.

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2.11. In relation to odour impacts, EA permitting guidance[3] indicates that impacts should be considered against benchmark levels based on the 98th percentile of hourly average concentrations of between 1.5 and 6 $ou_E/m^3$ depending on the type of odour.

2.12. Applicable EALs for ecological receptors are critical levels and load which have been imported into SCAIL from the Air Pollution Information Systems (APIS) website[4] as shown in **Table 2-3** below:

Table 2-3 Relevant Critical Levels and Loads – Ecological Receptors

| Site Name | Habitat | NOx Critical Level (Annual average µg/m³) | SO₂ Critical Level (annual average µg/m³) | NH₃ Critical Level (annual average µg/m³) | Nitrogen Deposition Critical Load (kgN/ha/yr) | Acid Deposition Critical Load (keq/ha/yr) |
|---|---|---|---|---|---|---|
| Grand Shore Wood | Broadleaved, mixed and yew woodland | 30 | 20 | 3 | 10 | 2.4 |
| Duck Pit Wood | Broadleaved, mixed and yew woodland | 30 | 20 | 3 | 10 | 3.1 |
| Maplehurst Wood | Broadleaved, mixed and yew woodland | 30 | 20 | 3 | 10 | 2.4 |
| Tollhurst Wood | Broadleaved, mixed and yew woodland | 30 | 20 | 3 | 10 | 2.4 |
| Unnamed Ancient Woodland 1 | Broadleaved, mixed and yew woodland | 30 | 20 | 3 | 10 | 3.1 |
| Unnamed Ancient Woodland 2 | Broadleaved, mixed and yew woodland | 30 | 20 | 3 | 10 | 3.1 |
| Gooseberry Wood | Broadleaved, mixed and yew woodland | 30 | 20 | 3 | 10 | 3.1 |
| Sissinghurst Park Wood SSSI | Broadleaved, mixed and yew woodland | 30 | 20 | 3 | 10 | 3.1 |

### Prediction of Impacts

2.13. The AERA guidance includes an initial screening technique is based on dispersion factors for differing stack heights derived from atmospheric dispersion modelling which has not been applied

2.14. In accordance with AERA guidance, emissions to air can be considered to be insignificant and not require further assessment if:

- the long-term process contribution is <1% of the long-term environmental standard; and

- the short-term process contribution is <10% of the short-term environmental standard.

2.15. For process contributions that cannot be considered insignificant the need for detailed modelling is determined against the following threshold criteria:

- [Maximum Process Contribution (long term) + background concentration] > 70% of the Environmental Assessment Level; or

- Maximum Process Contribution (short term) > 20% of the difference between the short-term environmental benchmark minus twice the long-term background concentration.

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[3] H4 odour management – how to comply with your environmental permit. Environment Agency, 2011
[4] APIS (2020). Air Pollution Information System. Available at: http://www.apis.ac.uk/

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2.16. Where modelling is required, the impacts of the identified emissions at receptors has been predicted using the SCAIL dispersion model for Agriculture[5] and Combustion[6] which utilises dispersion algorithms from the AERMOD dispersion model.

2.17. The SCAIL Combustion model has been used to predict annual average ground level NOx and $SO_2$ concentrations from combustion sources, as well as resultant acid deposition and nitrogen deposition at receptor locations.

2.18. Annual average $NO_2$ concentrations have also been predicted by converting NOx to $NO_2$, assuming 70% of the annual average NOx concentration is $NO_2$ in accordance with EA guidance[1]. Consideration of potential short-term averaging period of $NO_2$ and $SO_2$ has been undertaken assuming a conservative relationship of 1:50 between annual and the short-term averaging periods for these pollutants from point sources of this nature (height, exit velocity and temperature).

2.19. The SCAIL Agriculture model has been used to predict annual average ground level odour and ammonia concentrations, as well as resultant nitrogen and acid deposition at receptor locations.

2.20. The predicted Process Contributions (PCs) from the AD facility have been added to the estimated background concentrations to provide the Predicted Environmental Concentration (PEC). The PEC is calculated as presented below:

- Long-term averaging periods (i.e. annual average): PEC = PC + annual average background concentration.

2.21. For impacts on human receptor locations, EA guidance[1] requires that, as a minimum, the predicted PECs do not exceed the EALs.

2.22. For impacts of ammonia on ecological sites, EA guidance for intensive farming[7] requires the following screening criteria to be met (see Ta**ble 2-4**) and these are also considered applicable applied to assessment of subsequent nitrogen and acid deposition due to ammonia. Where the PC is less than the lower threshold for the relevant critical load or level, detailed modelling is not required.

Table 2-4 EA Screening Criteria for Ecological Sites

| Nature Conservation Designation Site | Distance from Site in km | Lower Threshold % | Upper Threshold % |
|---|---|---|---|
| SSSIs | 5 | 20 | 50 |
| Ancient Woodland | 2 | 100 | 100 |

[5] Centre for Ecology and Hydrology (CEH), Jacobs and Westlake Scientific Consulting (2014). 'SCAIL Agriculture'. March 2014. Available at: http://www.scail.ceh.ac.uk/cgi-bin/agriculture/input.pl

[6] Centre for Ecology and Hydrology (CEH), Jacobs and Westlake Scientific Consulting (2014). ''SCAIL Combustion. May 2010. Available at: http://www.scail.ceh.ac.uk/cgi-bin/combustion/input.pl

[7] Environment Agency (2016). 'Intensive Farming Risk Assessment for your Environmental Permit'.

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## 3. QUANTIFICATION OF EMISSIONS

### Ammonia and Odour Sources

3.1. The ammonia scrubber and biogas upgrade plant have been identified as point sources of ammonia and odour as summarised in **Table 3-1**.

Table 3-1 Point Source Characteristics - Emissions of Odour and Ammonia

| Parameter | Unit | Ammonia Scrubber | Biogas Upgrade Plant |
|---|---|---|---|
| ID | | A4 | A5 |
| Applied location | x,y | 579413,141190 | 579475,141210 |
| Actual flue gas flow rate | $Am^3/s$ | 0.31 | 0.18 |
| Flue internal diameter | m (ID) | 0.2 | 0.1 |
| Flue height (above ground level) | m (AGL) | 5.3 | 8.4 |

NOTE: The SCAIL source type 'housing fan' has been used as a proxy to represent the ammonia scrubber and biogas upgrade unit flues.

3.2. The 'actual' flue gas flow rate (from manufacturers specification) has been applied alongside manufacturers emission standards to calculate pollutant emission rates for these sources as presented in **Table 3-2**.

Table 3-2 Point Source Pollutant Emission Rates of Odour and $NH_3$

| Pollutant | Ammonia Scrubber | | Biogas Upgrade Plant | |
|---|---|---|---|---|
| | Manufacturers Emission Standard | Emission Rate | ELV | Emission Rate |
| $NH_3$ (kg/yr) | 15 (ppm) | 110 | 10 (ppm) | 44 |
| Odour kou/yr) | 1,000 ($ou_E/m^3$) | 9,636,000 | 10 (ppm $H_2S$) | 2,912,700 |

3.3. The feedstock storage and digestate storage areas have also been identified as fugitive $NH_3$ and odour sources as summarised in **Table 3-3** below.

Table 3-3 Fugitive Odour and Ammonia Emission Sources

| Parameter | Unit | Feedstock Storage | Digestate Storage |
|---|---|---|---|
| Source Type | - | Litter/manure storage – manure belts | Slurry |
| Applied location | x,y | 579410,141165 | 579517,141185 |
| $NH_3$ emission | kg/yr | 1190[a] | 215[b] |
| Odour emission | kOu/yr | 961,848,000[a] | 48,439,296[b] |
| Tonnes fresh manure | T | 500 | 500 |
| Area of storage | $m^2$ | 175 | 768 |

[a] SCAIL default emissions for manure belts source type.

[b] User defined emissions. Emissions have been obtained from the SCAIL Agriculture User Guide[2] for 'Slurry – lagoon with rigid cover' source type. Emissions from digestate would be anticipated to be circa 90% lower than from slurry.

### Combustion Point Sources

3.4. The CHP, boilers and biogas flare have been identified as point source emissions of combustion emissions as summarised in **Table 3-4**.

Table 3-4:Combustion Point Source Emission Characteristics (from manufacturers specifications)

| Parameter/Unit | | CHP | Biogas Flare | Boiler |
|---|---|---|---|---|
| ID | | A1 | A2 | A3 |
| Stack Height | m | 10 | 7.8 | 6.2 |
| Applied location | x,y | 579469,141194 | 579502,141209 | 579425,141174 |
| Actual Flow Rate | $Am^3/s$ | 1.047 | 0.62 | 0.62 |
| Oxygen content | % (dry) | 11.0 | 12.1 | Not required |
| Water content | % | 8.8 | 8.6 | Not required |
| Stack Gas Temperature | °C | 180 | 1,100 | 70 |
| Normalised Flow Rate | $Nm^3/s$ (0°C, 1atm, dry, reference $O_2$) | 0.96 (@ 15% $O_2$) | 1.24 (@ 3% $O_2$) | Not required |
| Stack Inner Diameter | m | 0.25 | 2 | 0.25 |
| Stack Gas Velocity | m/s | 21.33 | 4.41 | 12.56 |

3.5. For the CHP and Flare (A1 & A2), the 'normalised' flue gas flow rate and relevant Emission Limit Values (ELVs) have been used to calculate pollutant emission rates input to SCAIL, as presented in **Table 3-5**. For the Boiler the emission rate has been calculated from the NOx-rating for a 1300kW boiler.

Table 3-5 Pollutant Emission Rates

| Pollutant | CHP | | Biogas Flare | | Boilers | |
|---|---|---|---|---|---|---|
| | ELV (mg/Nm$^3$) | Emission Rate (g/s) | ELV (mg/Nm$^3$) | Emission Rate (g/s) | ELV (mg-NOx/kW) | Emission Rate (g/s) |
| NOx | 190 | 0.183 | 150 | 0.186 | 60 | 0.22 |
| SO$_2$ | 40 | 0.039 | - | 0.131 | - | - |

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## 4. PREDICTED IMPACTS

4.1. The results of the modelling of $NO_2$ impacts for the sources included in SCAIL Combustion are summarised in **Table B.1, Appendix B**. The predicted annual average $NO_2$ PECs do not exceed 70% of the EAL at any of the modelled human receptor locations and therefore further modelling is not required and the impacts are considered not significant.

4.2. The potential short-term PCs of $NO_2$ and $SO_2$ at human receptor locations will be less than 50-fold the annual average impacts. The maximum annual average $NO_2$ concentration is 0.3µg/m$^3$ and therefore short-term PCs of $NO_2$ and $SO_2$ will not exceed 15µg/m$^3$; less than 10% of the short-term EALs and therefore further modelling is not required, and the impacts are considered insignificant.

4.3. The results of the modelling of odour impacts for the sources included in SCAIL Agriculture are summarised in **Table A.1, Appendix A.** The predicted annual average odour concentrations marginally exceed the upper benchmark of 6 ou$_E$/m$^3$ at one receptor. However, it is important to note that a majority of the modelled odour emission relate to the manure storage area which is predominately an existing source and the applied emission rates assume this storage area is full year round and do not reflect the range of operational measures to mitigate emissions this source. It is therefore considered that the actual odour emissions and impacts will not exceed the benchmark level and the measures detailed in the Odour Management Plan (accompanying the Permit application) will ensure that offsite odour impacts are not unacceptable.

4.4. The results of the modelling of annual NOx and $NH_3$ concentrations, nitrogen deposition and acid deposition impacts for the sources included in SCAIL Agriculture are summarised in **Table A.2** and **Table A.3, Appendix A.** The predicted annual average PC $NH_3$ concentrations, nitrogen deposition and acid deposition rates do not exceed the EA screening criteria (20% of the EAL at SSSIs and 100% of the EAL at LWSs) outlined in **Table 3** at any of modelled ecological receptor locations and therefore further modelling is not required, and the impacts are considered not significant.

4.5. The results of the modelling of $SO_2$ concentrations, nitrogen deposition and acid deposition impacts for the sources included in SCAIL Combustion are summarised in **Table B.2** and **Table B.3, Appendix B.** The predicted annual average PC $SO_2$ concentrations, nitrogen deposition and acid deposition rates do not exceed 1% of the EAL at any of modelled ecological receptor locations and therefore further modelling is not required and the impacts are considered insignificant.

## 5. SUMMARY AND CONCLUSIONS

5.1. An Air Emission Risk Assessment has been undertaken to identify and quantify the potential impacts due to the AD facility at Knoxbridge Farm on sensitive ecological and human receptors.

5.2. The SCAIL Agriculture model has been used to calculate predicted odour impacts at human receptor locations, and $NH_3$, nitrogen deposition and acid deposition impacts at ecological receptor locations, as a result of point source and fugitive emission sources associated with the AD facility.

5.3. The predicted annual average odour concentrations marginally exceed the upper benchmark of 6 $ou_E/m^3$ at one receptor. However, it is important to note that a majority of the modelled odour emission relate to the manure storage area which is predominately an existing source and the applied emission rates assume this storage area is full year round and do not reflect the range of operational measures to mitigate emissions this source. It is therefore considered that the actual odour emissions and impacts will not exceed the benchmark level and the measures detailed in the Odour Management Plan (accompanying the Permit application) will ensure that offsite odour impacts are not unacceptable.

5.4. The predicted annual average PC to $NH_3$ concentrations, nitrogen deposition and acid deposition rates do not exceed the EA screening criteria (20% of the EAL at SSSIs and 100% of the EAL at LWS) at any of modelled ecological receptor locations and are therefore considered not significant.

5.5. The SCAIL Combustion model has been used to calculate predicted $NO_2$ impacts (or PCs) at human receptor locations, and NOx, $SO_2$, nitrogen deposition and acid deposition impacts at ecological receptor locations, as a result of combustion sources associated with the AD site.

5.6. The predicted annual average $NO_2$ PECs do not exceed 70% of the EAL at any of the modelled human receptor locations and are therefore considered not significant.

5.7. The potential short-term PC impacts of $NO_2$ and $SO_2$ at human receptor locations will not exceed 10% of the short-term EALs and therefore considered insignificant

5.8. The predicted annual average PC to $SO_2$ concentrations, nitrogen deposition and acid deposition rates do not exceed 1% of the EAL at any of modelled ecological receptor locations are therefore considered insignificant.

5.9. Overall, impacts associated with the AD plant at Knoxbridge farm on human and ecological receptor locations are considered to be not significant and acceptable; therefore, further assessment is not considered to be required.

**DOCUMENT ISSUE RECORD**

| Technical Note No | Rev | Date | Prepared | Checked | Reviewed (Discipline Lead) | Approved (Project Director) |
|---|---|---|---|---|---|---|
| 49114/3001/TN001 | Draft | 23/10/2020 | LS | PB | PB | NJM |
| 49114/3001/TN001 | Final | 26/10/2020 | LS | PB | PB | NJM |
| 49114/3001/TN001_v2 | Rev2 | 27/01/2021 | LS | PB | PB | NJM |

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## Appendix A  SCAIL Agriculture Results

### Human Receptors

Table A.1 Predicted Annual Average Odour Impacts

| Location | Odour PC (ou/m$^3$) | Odour PC as % EAL | Background Odour (ou/m$^3$) | PEC Odour (ou/m$^3$) | PEC Odour as % of EAL |
|---|---|---|---|---|---|
| Little Wadd Stables | 6.7 | **224** | 0 | 6.7 | **224** |
| Knoxbridge Barn | 2.8 | 93 | 0 | 2.8 | 93 |
| Rose Cottage Farm Barn | 4.2 | **140** | 0 | 4.2 | **140** |
| Iden Grange | 1.6 | 54 | 0 | 1.6 | 54 |

### Ecological Receptors

Table A.2 Predicted Annual Average NH$_3$ Impacts

| Location | NH$_3$ PC (µg/m$^3$) | NH$_3$ PC as % EAL | Background NH$_3$ | PEC NH$_3$ (µg/m$^3$) | PEC NH$_3$ as % of EAL |
|---|---|---|---|---|---|
| Duck Pit Wood | 0.56 | 19 | 1.54 | 2.10 | 69.9 |
| Grand Shore Wood | 0.57 | 19 | 1.43 | 2.00 | 66.7 |
| Maplehurst Farm Wood | 1.05 | 35 | 1.43 | 2.48 | 82.5 |
| Tollhurst Wood | 0.21 | 7 | 1.43 | 1.64 | 54.6 |
| Ancient Woodland 1 | 0.13 | 4 | 1.43 | 1.56 | 52.0 |
| Ancient Woodland 2 | 0.13 | 4 | 1.43 | 1.56 | 52.0 |
| Gooseberry Wood | 0.13 | 4 | 1.43 | 1.56 | 52.0 |
| Sissinghurst Park Wood | 0.09 | 3 | 1.66 | 1.75 | 58.4 |

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Table A.3 Predicted Annual Average Nitrogen and Acid Deposition Impacts

| Location | N Dep PC (kgN/ha/yr) | N Dep PC as % EAL | Background N Dep (kgN/ha/yr) | PEC N Dep (kgN/ha/yr) | PEC N Dep as % of EAL | Acid Dep PC (keq/ha/yr) | Acid Dep PC as % EAL | Background Acid Dep (keq/ha/yr) | PEC Acid Dep (keq/ha/yr) | PEC Acid Dep as % of EAL |
|---|---|---|---|---|---|---|---|---|---|---|
| Duck Pit Wood | 4.3 | 43 | 27.2 | 31.5 | 315 | 0.29 | 10 | 2.11 | 2.40 | 79 |
| Grand Shore Wood | 4.4 | 44 | 26.3 | 30.7 | 307 | 0.30 | 12 | 2.06 | 2.36 | 97 |
| Maplehurst Farm Wood | 8.2 | 82 | 26.3 | 34.5 | 345 | 0.55 | 23 | 2.06 | 2.61 | 108 |
| Tollhurst Wood | 1.6 | 16 | 26.3 | 27.9 | 279 | 0.11 | 5 | 2.06 | 2.17 | 89 |
| Ancient Woodland1 | 1.0 | 10 | 26.3 | 27.3 | 273 | 0.07 | 2 | 2.06 | 2.13 | 69 |
| Ancient Woodland2 | 1.0 | 10 | 26.3 | 27.3 | 273 | 0.07 | 2 | 2.06 | 2.13 | 70 |
| Gooseberry Wood | 1.0 | 10 | 26.3 | 27.3 | 273 | 0.07 | 2 | 2.06 | 2.13 | 70 |
| Sissinghurst Park Wood | 0.72 | **7.2** | 29.7 | 30.4 | 304 | 0.05 | 2 | 2.30 | 2.35 | 77 |

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## Appendix B  SCAIL Combustion Results

**Human Receptors**

Table B.1 Predicted Annual Average NO$_2$ Impacts

| Location | NO$_2$ PC (µg/m$^3$) | NO$_2$ PC as % EAL | Background NO$_2$ (µg/m$^3$) | PEC NO$_2$ (µg/m$^3$) | PEC NO$_2$ as % of EAL |
|---|---|---|---|---|---|
| Little Wadd Stables | 0.3 | 0.6 | 7.8 | 8.1 | 20.2 |
| Knoxbridge Barn | 0.2 | 0.4 | 8.0 | 8.1 | 20.3 |
| Rose Cottage Farm Barn | 0.2 | 0.5 | 7.9 | 8.1 | 20.3 |
| Iden Grange | 0.1 | 0.3 | 8.2 | 8.3 | 20.8 |

**Ecological Receptors**

Table B.2 Predicted Annual Average NOx and SO$_2$ Impacts

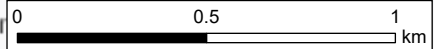| Location | NOx PC (µg/m$^3$) | NOx PC as % EAL | Background NOx | PEC NOx (µg/m$^3$) | PEC NOx as % of EAL | SO$_2$ PC (µg/m$^3$) | SO$_2$ PC as % EAL | Background SO$_2$ | PEC SO$_2$ (µg/m$^3$) | PEC SO$_2$ as % of EAL |
|---|---|---|---|---|---|---|---|---|---|---|
| Grand Shore Wood | 0.2 | 0.6 | 10.3 | 10.5 | 34.9 | 0.07 | 0.35 | - | 0.07 | 0.35 |
| Duck Pit Wood | 0.2 | 0.6 | 10.1 | 10.3 | 34.3 | 0.07 | 0.35 | - | 0.07 | 0.35 |
| Maplehurst Farm Wood | 0.3 | 1.0 | 10.1 | 10.4 | 34.6 | 0.10 | 0.50 | - | 0.10 | 0.50 |
| Tollhurst Wood | 0.1 | 0.3 | 10.3 | 10.4 | 34.7 | 0.04 | 0.20 | - | 0.04 | 0.20 |
| Ancient Woodland 1 | 0.1 | 0.2 | 10.1 | 10.1 | 33.7 | 0.03 | 0.15 | - | 0.03 | 0.15 |
| Ancient Woodland 2 | 0.1 | 0.2 | 10.3 | 10.4 | 34.7 | 0.03 | 0.15 | - | 0.03 | 0.15 |
| Gooseberry Wood | 0.1 | 0.2 | 10.3 | 10.4 | 34.7 | 0.03 | 0.15 | - | 0.03 | 0.15 |
| Sissinghurst Park Wood | 0.1 | 0.2 | 9.9 | 9.9 | 33.0 | 0.02 | 0.10 | | 0.02 | 0.10 |

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Table B.3 Predicted Annual Average Nitrogen and Acid Deposition Impacts
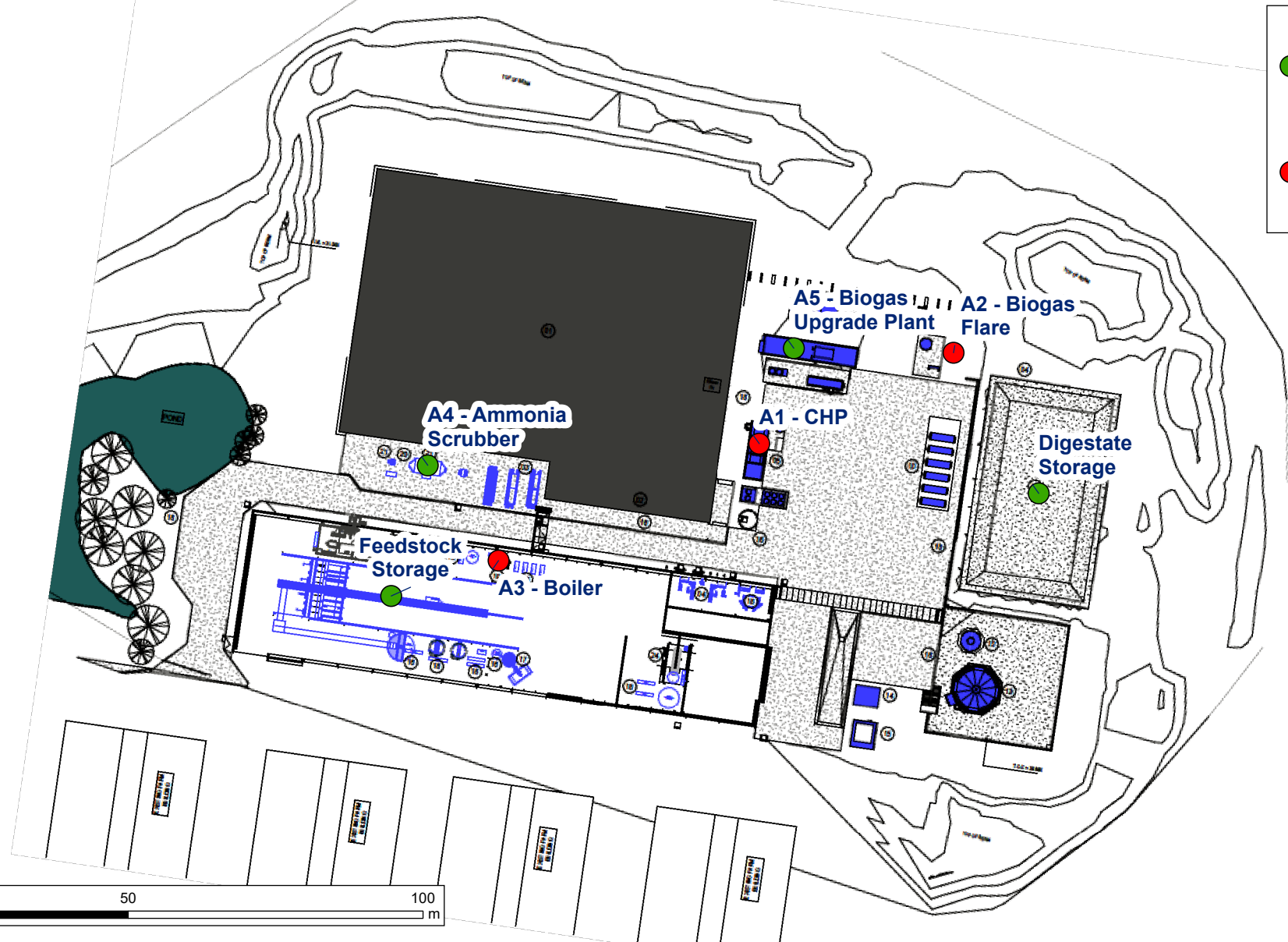
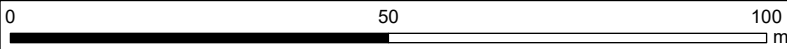| Location | N Dep PC (kgN/ha/yr) | N Dep PC as % EAL | Background N Dep | PEC N Dep (kgN/ha/yr) | PEC N Dep as % of EAL | Acid Dep PC (keq/ha/yr) | Acid Dep PC as % EAL | Background Acid Dep | PEC Acid Dep (keq/ha/yr) | PEC Acid Dep as % of EAL |
|---|---|---|---|---|---|---|---|---|---|---|
| Grand Shore Wood | 0.02 | 0.2 | 26.3 | 26.3 | 263.4 | 0.007 | 0.3 | 2.06 | 2.07 | 85.1 |
| Duck Pit Wood | 0.02 | 0.2 | 27.2 | 27.2 | 271.8 | 0.007 | 0.2 | 2.11 | 2.12 | 69.4 |
| Maplehurst Farm Wood | 0.03 | 0.3 | 26.3 | 26.4 | 263.5 | 0.010 | 0.4 | 2.06 | 2.07 | 85.5 |
| Tollhurst Wood | 0.01 | 0.1 | 26.3 | 26.3 | 263.3 | 0.003 | 0.1 | 2.06 | 2.06 | 84.9 |
| Ancient Woodland 1 | 0.01 | 0.1 | 26.3 | 26.3 | 263.3 | 0.002 | 0.1 | 2.06 | 2.06 | 67.2 |
| Ancient Woodland 2 | 0.01 | 0.1 | 26.3 | 26.3 | 263.3 | 0.002 | 0.1 | 2.06 | 2.06 | 67.4 |
| Gooseberry Wood | 0.01 | 0.1 | 26.3 | 26.3 | 263.3 | 0.002 | 0.1 | 2.06 | 2.06 | 67.4 |
| Sissinghurst Park Wood | 0.01 | 0.1 | 29.7 | 29.7 | 296.9 | 0.002 | 0.1 | 2.30 | 2.30 | 75.0 |

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**Legend**
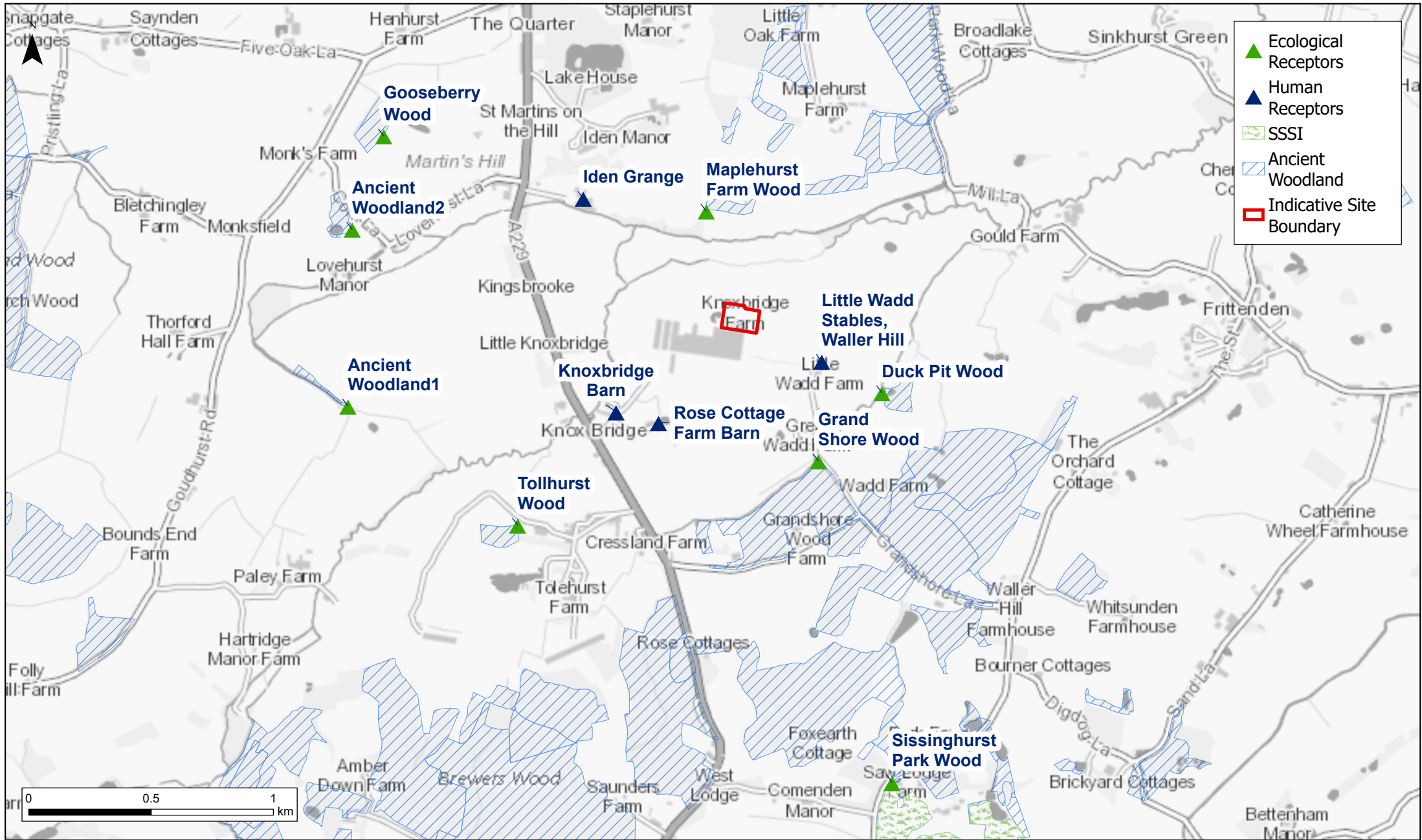
- ▲ Ecological Receptors
- ▲ Human Receptors
- SSSI
- Ancient Woodland
- Indicative Site Boundary

**Labels on map:**

Gooseberry Wood
Ancient Woodland2
Iden Grange
Maplehurst Farm Wood
Ancient Woodland1
Little Wadd Stables, Waller Hill
Knoxbridge Barn
Duck Pit Wood
Rose Cottage Farm Barn
Grand Shore Wood
Tollhurst Wood
Sissinghurst Park Wood

**Stantec**

Green Create W2V Kent Ltd.

**KNOXBRIDGE FARM**
Receptor Locations

OS_Open_Greyscale_2: Contains OS data © Crown Copyright and database right 2020

1:20,000 @ A4 | Date: 20/10/2020
Drawn: LS | Checked: PB
Figure 01 | Rev A

N

SCAIL Agriculture Modelled Sources

SCAIL Combustion Modelled Sources

A5 - Biogas Upgrade Plant

A2 - Biogas Flare

A4 - Ammonia Scrubber

A1 - CHP

Digestate Storage

Feedstock Storage

A3 - Boiler

POND

0    50    100
m

| | KNOXBRIDGE FARM | 1:1,000 @ A4 | Date: 20/10/2020 |
|---|---|---|---|
| Stantec — Green Create W2V Kent Ltd | Modelled Sources | Drawn: LS | Checked: PB |
| | | Figure 02 | Rev A |