MURROW AD PLANT LTD
PERMIT VARIATION APPLICATION
MARCH 2023

Site Condition Report

Prepared for
Murrow AD Plant Ltd

CHAPMANBECK
ENVIRONMENTAL CONSULTANCY

REPORT SCHEDULE

Client: Murrow AD Plant Ltd

Project Title: Murrow AD Plant Permit Variation Application

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Project Director: Sophie Swan, Operations Manager, Adapt Biogas

Project Manager: Jo Chapman (Chapman Beck Limited)

AUTHOR	DATE
Jo Chapman	25.10.22

REVIEWER	DATE
Sophie Swan	29.03.23

APPROVED	DATE
Sophie Swan	29.03.23

Revision History

DATE OF REVISION	NEW VERSION	REASON FOR CHANGE	APPROVED
12.02.24	V2.0 FINAL	Update application at duly making due to change scope of variation	Murrow AD Plant Ltd. 16.02.24

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1. Sections 1-3 to be completed during the permit application

1 Site Details	
Name of the Applicant	Murrow AD Plant Ltd
Activity Address	Somerset Farm Cants Drove, Murrow, Wisbech, Cambs, PE13 4HN
National Grid Reference	TF 37303 04635
Document reference and dates from Site Condition Report at permit application and surrender	No site condition report submitted at original permit application which was for a standard-rules permit. This document is now prepared to support a variation of the permit from standard rules to bespoke. Document reference is 'CB2107-06 Site Condition Report'.
Document reference for site plans (including location and boundaries)	CB2107-05a Permit Boundary and Emissions Points Plan (24726 - 155 Rev N - Permit Boundary and Emissions Plan) (plan also shows areas added to permit area boundary under current variation) CB2107-05b Murrow Plant Site Location Plan (MUR-OD-019 ETL495EPR02_Murrow AD Plant Site Location Plan) CB2107-05c Detailed Site Layout Plan (851040_GA-Murrow AD Plant - BioCow_RevC-01 20191218) CB2107-08 Environmental Risk Assessment to Support Permit Variation Application CB2107-06 Site Condition Report Appendices 1-4 CB2107-11 BAT Assessment to Support Permit Variation Application

Site Aerial Photograph

Note from EA guidance document:

In Part A of the application form you must give us details of the site's location and provide us with a site plan. We need a detailed site plan (or plans) showing: Site location, the area covered by the site condition report, and the location and nature of the activities and/or waste facilities on the site; locations of receptors, sources of emissions/releases, and monitoring points; site drainage; and site surfacing. If this information is not shown on the site plan required by Part A of the application form, then you should submit the additional plan or plans with this site condition report.

2 Condition of the land at permit issue	
Environmental setting including: Geology, hydrogeology and surface waters	Information in this section is based on search data from the DEFRA 'Magic Maps' searches site, the .gov website 'flood maps for planning service' and the findings of 'Groundsure' Search Report, reference GS-9090856 and included as an appendix to this Site Condition Report. A preapplication habitats screening report has also been provided by the Environment Agency and is included as an appendix to CB2107-08 Environmental Risk Assessment. **Geology**: The western corner of the site is located on loamy and clayey soils of coastal flats with naturally high groundwater, whilst the location of the rest of the site is depicted as loamy and sandy soils with naturally high groundwater and a peaty surface.

Hydrogeology and Hydrology:

The western corner of the site is situated upon an unproductive secondary aquifer and a principal bedrock aquifer (medium-low vulnerability), and the location of the remainder of the site is described as unproductive aquifer.

The site is not within a Groundwater Source Protection Zone or within a Drinking Water Protected Area or Safeguard Zone. The nearest know abstraction licence is located 1671m west of the site and the activity is for the purpose of spray irrigation of crops.

The site is situated in Flood Zone 3 and shown on the 'Groundsure report' GS-9090856 to be at medium risk for flooding. There are no documented or know historical flooding events at the site. The site can remove groundwater rising by pumping the clean water into a nearby ditch. The sites is not within a Nitrate Vulnerable Zone.

Surface Water:

There are watercourses within proximity to the site as it is situated on artificially drained Fenland, with all fields having drainage ditches. There is a drain which runs to the south and west of the AD site just over 10 metres from the permitted site boundary.

The Bishoplands Drain is 1.8 km to the west of the site, the Peakirk Drain 1.16 km to the south of the site. The River Nene is 2.5 km to the south and east of the site.

Statutory and Non-Statutory Designated Sites:

Nene washes SSSI, SPA and RAMSAR Site is approximately 2.2km to the south of the site.

The site is within 500m of parcels or priority habitat inventory coastal and floodplain grazing marsh.

Preliminary Conceptual Model:

Water

Source – Silage liquor, liquid feedstocks, liquid digestate

Pathway – Run off to surface water or seepage to ground

Receptors - Surface water drainage ditches, aquatic life and abstractors

Air

Source – exhaust gases, biogas/LNG, odours/ammonia/bioaerosols from feedstocks and digestate.

Pathways – release to atmosphere from digestate and feedstock exposed surfaces, point source releases from combustion sources, and emergency pressure relief valves.

Receptors – People in residential, workplace and amenity settings

Pollution history including: Pollution incidents that may have affected land Historical land-uses and associated contaminants Any visual/olfactory evidence of existing contamination Evidence of damage to pollution prevention measures	**Pollution History/Pollution Incidents**: The site is located in an area of open fenland and has historically been in agricultural use prior to development. The site continues to operate in a wider farming context. There is no history or evidence of pollution at the site prior to development. **Historical Land Uses**: The site has been in use as an agricultural field in a wider fenland farming catchment. **Visual/olfactory evidence** No visual or olfactory evidence of contamination was noted in the trial pits investigated prior to construction. **Evidence of damage to pollution prevention measures**: The area of land at the north of the main site is currently in use as part of ongoing operations. This area was intended to be included in the original standard rules permitted area, but the original green line boundary plan did not encompass the full extent of operations. This area is now added to the permitted area to 'regularise' operations to reflect the as built footprint of the site. The additional storage clamp area has been in use on the wider Somerset farms for production of silage and storage of farm-based feedstocks prior to inclusion in the AD permitted area. On visual inspection the site is fit for purpose and activities in the area will continue as current once added to the permitted area.
Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)	**Historical Contamination**: The site is located in an area of open fenland and has historically been in agricultural use prior to development. The site continues to operate in a wider farming context. There is no history or evidence of pollution at the site prior to development, and no visual or olfactory evidence of pollution identified during site survey works undertaken.
Baseline soil and groundwater reference data	**Baseline soil and groundwater data is presented within the following document**: CB2107-06 Appendix 1 491893 - Somerset Farm, Murrow Interpretative Report V2 CB2107-06 Appendix 4 A F Howland Report (ADB-21.237)
Supporting information can include: Source information identifying environmental setting and pollution incidents Historical Ordnance Survey plans Site reconnaissance	CB2107-06 Appendix 1 491893 - Somerset Farm, Murrow Interpretative Report V2 CB2107-06 Appendix 2 GS-9090856 (Groundsure Report) CB2107-06 Appendix 3 GS-9090855_smallScale (Historical Site Maps) CB2107-06 Appendix 4 A F Howland Report (ADB-21.237)

Historical investigation / assessment / remediation / verification reports Baseline soil and groundwater reference data	
3 Permitted Activities	
Permitted activities	The Murrow AD Plant Ltd is a wet mesophyllic anaerobic digestion (AD) facility located at Somerset Farm Cants Drove, Murrow, Wisbech, Cambs, PE13 4HN, approx. central grid reference TF 37303 04635. Murrow AD Plant Ltd has entered into an operations and maintenance contract with Adapt Biogas Ltd who oversee operations and maintenance at the site working on behalf of Murrow AD Plant Ltd. The site is currently permitted to operate according to standard rules permit SR2021 No.8; on farm anaerobic digestion facility using farm waste only, including use of the resultant biogas; Part A installation – treatment capacity over 100 tonnes of waste per day Environmental Permit No. EPR/FB3133AW/V005. Following the now requested variation to the permit, the operator will operate according to a bespoke installation permit with the capacity to process up to 125,000tonnes of feedstocks a year in the AD site. The average hydraulic retention time for feedstocks processed at the site is 39 days. In addition to the main Schedule 1 anaerobic digestion (AD) activity at the site, there are several other directly associated activities (DAA's) undertaken as follows; emergency flare operations, biogas combustion in CHP engines, biogas upgrading to biomethane, raw material storage, biogas treatment (desulphurisation), digestate separation, digestate storage, incoming waste storage and treatment, recovery of CO_2 to produce a food grade product, and storage of the final recovered liquid CO_2 product. The operator processes purpose grown crops, (principally maize), crop residues, liquid residues, and animal manures and slurries within five primary and one secondary anaerobic digestion tank to produce biogas and digestate. Solid farm-based feedstocks are stored in a series of outdoor concrete bays prior to processing or offsite transfer, and liquid feedstocks are received into a liquid reception tank. Farm based feedstocks with higher odour potential such as poultry manures are accepted on a 'just in time' basis according to the procedures outlined in the site odour management plan. Feedstocks are introduced into the process via feeding units which are top loaded using a telehandler. Biogas produced in the AD process is stored in gas storage roofs in the head space of the five digesters. The biogas is used within two 250 kW combined heat and power (CHP) engines (each with thermal inputs of 0.619MW). These CHPs provide both heat and power for site operations as do a further two 500 kW CHPs (each with thermal inputs of 1.193MW) which are run on imported liquified natural gas (LNG). All four engines were commissioned after December 2018. The remaining biogas produced at the site is upgraded to produce biomethane and injected directly to the high-pressure National Gas Transmission (NTS) system via 1km of pipework and a block valve

	connection. The biomethane does not need to be blended to a distribution specification, (with for instance the addition of propane or gas odorant). As no odorant is needed, no odorant chemicals are handled at the site. During the biogas upgrading process, carbon dioxide (CO_2) is removed from biogas and vented to atmosphere. The Murrow AD site undertakes an additional step to recover the CO_2 which might otherwise be vented to atmosphere. The CO_2 is processed in a CO_2 recovery facility that removes any final trace impurities and transforms the CO_2 into a liquid state. The recovered liquid CO_2 is then stored in a tank as a final product that reaches end of waste status and is fit for use in the food and drink manufacturing and supply industry. Final digestate arising from the process is passed through a separator to produce a separated liquid and solid fraction. The separated solid fraction drops into a concrete bay and is routinely taken off site for interim storage in satellite field heaps at the intended site of spreading for use as an agricultural fertiliser or soil conditioner. The separated liquid digestate is piped to one of two earth bank digestate stores/lagoons. The lagoons are filled via a direct pipeline connection from the AD site. A diverter arrangement allows the operator to select which lagoon digestate will be sent to. Digestate produced at the site is not currently regulated as a waste as sole waste inputs are manures and slurries. Separated liquid digestate is spread to land from store, for agricultural benefit. Condensate arising from the gas line, CHPs and upgrading unit is collected in a dedicated collection system and pumped back through the process. The site operates an emergency flare for management of excess gas during engine or upgrading unit downtime. This flare is capable of burning all biogas produced at the site in an emergency situation should the need arise. The site is also equipped with an emergency backup diesel generator which will provide sufficient power to operate key functions during power outage to maintain safe site operations until normal operations resume. Hydrogen sulphide levels and associated damage to plant and equipment is managed via dosing of ferric hydroxide and ferric oxide via the feeder units. Oxygen injection is also undertaken to allow for biological management of hydrogen sulphide on sulphur nets in the heads of the digesters. Process tanks and storage vessels are fitted with agitators, high level alarms, and in the case of gas tight vessels, emergency under/over pressure relief valves. The whole facility is operated in accordance with an Environmental Management System (EMS) and technical competence requirements are met by inhouse staff who hold the relevant AD WAMITAB qualification. Clean surface water and effluent/run off from storage areas is collected in a series of sumps and diverted for use within the AD process. Clean surface water accumulating in defined surface areas at the site is released to surface ditched following testing for compliance with specified water quality benchmarks.

	Clean water associated with discharge point W1 is collected in an offsite sump and then either stored in the digestate lagoon or used within the AD process. Discharge points W2 and W3 are points where 'test and release' batches are released to the adjacent drainage ditch.
Non-permitted activities undertaken on site	There are no non-permitted activities that take place within the permitted area. Digestate produced at the site is stored in two offsite earth bank lagoons. The whole site operates in the context of a wider agricultural farming operation incorporating livestock and arable/grass farming activities.

Note from EA guidance document:

In Part A of the application form you must give us details of the site's location and provide us with a site plan. We need a detailed In Part B of the application form you must tell us about the activities that you will undertake at the site. You must also give us an environmental risk assessment. This risk assessment must be based on our guidance (Environmental Risk Assessment - EPR H1) or use an equivalent approach.

It is essential that you identify in your environmental risk assessment all the substances used and produced that could pollute the soil or groundwater if there were an accident, or if measures to protect land fail.

These include substances that would be classified as 'dangerous' under the Control of Major Accident Hazards (COMAH) regulations and also raw materials, fuels, intermediates, products, wastes and effluents.

If your submitted environmental risk assessment does not adequately address the risks to soil and groundwater we may need to request further information from you or even refuse your permit application.

2. Sections 4-7 to be completed during the life of the permit

4 Changes to the activity	
Have there been any changes to the activity boundary?	Changes to the site boundary are proposed as part of permit variation application now submitted (EPR/FB3133AW/V006). Additional land is to be added to the permitted area to include an additional clamp feedstock storage area. Some other small additions are also made to regularise the site boundary in the permit to match the as built configuration on the ground.
Have there been any changes to the permitted activities?	The main Schedule 1 anaerobic digestion activity remains unchanged. Annual tonnages processed at the site have increased to 125,000tpa processed in the AD process. The permit is now varied to bespoke from standard rules. At variation V006, addition is also made of a new directly associated activity for installation of a CO_2 recovery unit and liquid CO_2 storage tank.
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	None
Checklist of supporting information	CB2107-02 Summary of Changes CB2107-05a Site Boundary and Emissions Points Plan which also shows areas of land added to the permit boundary.
5 Measures taken to protect the land	
The feedstock storage and digesters/process tanks are all contained by a concrete bund. Surface water and leachate/silage liquor is collected in a series of internal sumps in the bunded area and used in the AD process. There is one surface water drainage sump outside the boundary for containment of clean surface water arising from the site. This is contained and used in the process or pumped to the digestate store. Clean surface water from other defined areas of the site bund is tested before being released to an adjacent drainage ditch on a batch basis. The new feedstock storage clamp area has an impermeable concrete base and is connected to a sealed drainage collection system.	
Checklist of supporting information	CB2107-11 BAT Assessment
6 Pollution incidents that may have had an impact on land, and their remediation	
None	
Checklist of supporting information	

7 Soil gas and water quality monitoring (where undertaken)
None undertaken at the current time

Checklist of supporting information	

3. Sections 8-10 to be completed at surrender

8 Decommissioning and removal of pollution risk (where undertaken)

Checklist of supporting information	

9.0 Reference data and remediation (where relevant)
Say whether you had to collect land and/or groundwater data. Or say that you didn't need to because the information from sections 3, 4, 5 and 6 of the Surrender Site Condition Report shows that the land has not deteriorated.

Checklist of supporting information	

10.0 Statement of site condition

CHAPMANBECK
ENVIRONMENTAL CONSULTANCY

e : jo@chapmanbeck.com
t : 07715569393
www.chapmanbeck.com
Registered Company Number - 11711672