Beddington Lane AD Facility

784-B049185

Best Available Techniques and Operating Techniques

Environmental Permit Application

SUEZ Recycling and Recovery UK Ltd

March 2025

Document prepared on behalf of Tetra Tech Limited. Registered in England number: 01959704

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1.0 INTRODUCTION

1.1 REPORT CONTEXT

1.1.1 This Environmental Permit Application has been prepared by Tetra Tech on behalf of the Operator SUEZ Recycling & Recovery UK Ltd (SUEZ), in connection to an area of land located off Beddington Lane (the site), at 79 – 83 Beddington Lane, London Borough of Sutton, CR0 4TH at approximate National Grid Reference TQ 29657 66505. The site location and permit boundary are presented on Drawing Number SUEZ/B042242/PER/01.

1.1.2 SUEZ are seeking to apply for an environmental permit to allow the operation of an Anaerobic Digestion (AD) facility that will process food waste from household waste collections as well as industrial and commercial customers. The process will generate biogas which will mainly be processed by a Combined Heat and Power (CHP) engine to generate heat and electricity that would be used by the AD plant. Once the parasitic load has been met, any excess biogas will be processed by a gas upgrading plant to National Gas Grid criteria and injected into the gas grid via a gas main situated to the northeast corner of the site. Alternatively, excess biogas will be processed by the CHP engines to generate electricity that will be exported to the National Grid. The CHP engine will have a capacity of 1.2MW and therefore it's considered that the CHP engine will be subject to the Medium Combustion Plant Directive (MCPD) and therefore will comprise a MCP with a specified generator (SG).

1.1.3 The Operator also seeks to implement a wastewater treatment plant on site which will be used to treat the liquor extracted during the dewatering process of the digestate. Having been treated, the remaining liquid will be clean enough to be recirculated for washing down or within the process. Excess liquid will be discharged to public sewer, in accordance with a trade effluent discharge consent. The treatment capacity of the wastewater treatment plant is over 50 tonnes per day, causing it to be a Schedule 1 activity.

1.1.4 In addition, SUEZ seek to agree to undertake the process of carbon capture as a function of this application.

1.1.5 This Best Available Techniques and Operating Techniques (BATOT) document is an integrated document which describes both the operating techniques that will be implemented at the site to ensure compliance with the conditions of the Environmental Permit and also demonstrate that BAT will be employed.

1.1.6 This report has been prepared to satisfy the requirements of the following: -

- Environment Agency - Develop a management system: environmental permits (August 2022);
- Environment Agency - Control and monitor emissions for your environmental permit (May 2021);
- Environment Agency - Biological waste treatment: appropriate measures for permitted facilities (September 2022);
- Environment Agency - Best available techniques: environmental permits (February 2016);
- European Commission's BAT Reference (BREF) Document for Waste Treatment (August 2018);
- European Commission's BAT Conclusion for Waste Treatment (August 2018);
- European Commission – Industrial Emissions Directive (Directive 2010/75/EU); and,
- European Commission – Medium Combustion Plant Directive (Directive 2015/2193).

2.0 SITE DESCRIPTION

2.1 OVERVIEW OF AD FACILITY

2.1.1 As mentioned in Section 1.1.2, SUEZ are seeking to operate an AD facility at the site.

2.1.2 The AD facility would provide the treatment of organic food waste (initially from municipal waste streams only, although this is likely to be expanded to include some commercial food wastes as further facilities are developed). The process will generate biogas which will mainly be processed by a CHP engine to generate heat and electricity that would be used by the AD plant. Once the parasitic load has been met, any excess biogas will be processed by a gas upgrading plant to National Gas Grid criteria and injected into the gas grid via a gas main situated to the northeast corner of the site. Alternatively, excess biogas will be processed by the CHP engines to generate electricity that will be exported to the National Grid.

2.1.3 It is considered that the AD facility will fall under following Schedule 1 activity of the Environmental Permitting (England and Wales) Regulations 2016 (as amended): -

- Section 5.4 A(1)(b)(i) - Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving biological treatment.

2.1.4 In addition, the site will operate a wastewater treatment plant which will fall under the following Schedule 1 Activity: -

- Section 5.4 A(1)(a)(ii) - Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving physico-chemical treatment.

2.1.5 In addition to the above, the AD facility will have the following Directly Associated Activities (DAAs): -

- Storage of waste pending recovery or disposal;
- Physical treatment for the purpose of recovery;
- Heat and electricity power supply (i.e. CHP);
- Emergency flare operation;
- Gas upgrading;
- Carbon Capture;
- Raw material storage ;
- Gas storage; and,
- Digestate storage.

2.1.6 Details of the process description are provided in Section 4 of this document.

2.2 OPERATING HOURS

2.2.1 The facility will operate 24 hours a day, however, vehicle movements to and from the site will be restricted to the following hours: -

- 07:00 –19:00 – Monday – Sunday.

2.3 WASTE TYPES

2.3.1 The full list of waste codes permitted at the site are listed in Appendix A.

2.4 WASTE QUANTITIES

2.4.1 It is proposed that the AD facility will be designed to treat up to 100,000 tonnes of food waste per annum.

2.5 SITE LAYOUT

2.5.1 An indicative site layout plan of the AD facility is provided on Drawing Number 1452 PL100.

2.6 SITE SURFACING AND DRAINAGE

2.6.1 The site will benefit from an impermeable surface constructed to withstand activities associated with the permitted activities as well as prevent fugitive emissions to groundwater and surface water. The surfacing in all operational areas will be constructed from reinforced concrete and access roads will be constructed from asphalt.

2.6.2 In addition, the site will benefit from a sealed drainage system to ensure that no liquid will run of the surface other than via the system, except where those discharges may otherwise be permitted.

3.0 WASTE ACCEPTANCE PROCEDURES

3.1 PRE-ACCEPTANCE

3.1.1 Prior to accepting waste from new customers, SUEZ obtain and record information on the types of wastes to be accepted, the process producing the waste, predicted quantities, the form of the waste and any potential hazards associated with the wastes.

3.1.2 The information provided is reviewed against the site permit and the site-specific requirements relating to incoming waste and discussed with the Site Manager.

3.1.3 If the waste is confirmed to be acceptable at the site, a contractual arrangement is made with the waste supplier. The contract details the criteria for acceptance/rejection of loads delivered to the site for processing within the AD Facility.

3.1.4 Regular feedback on the quality of feedstock delivered to the site is provided verbally to each waste supplier.

3.1.5 If the waste is deemed unacceptable at the site, the customer will be notified, and the waste will not be accepted at the site.

3.1.6 The AD facility will accept organic food waste from waste collection authorities (WCA) as well as industrial and commercial customers. As such, in accordance with Section 6.1 of the Appropriate Measures Guidance, it's not considered appropriate to undertake a chemical analysis of the waste.

3.1.7 All records relating to the pre-acceptance will be kept for cross-reference a verification at the waste acceptance stage. These records will be kept for a minimum of 3 years.

3.1.8 SUEZ will reassess the information required at pre-acceptance on an annual basis or if the following apply: -

- Waste changes;
- Process giving rise to the waste changes; and,
- Waste received does not to conform to the pre-acceptance information.

3.2 ACCEPTANCE PROCEDURES

3.2.1 All loads delivered to the site are weighed at the weighbridge on arrival. The weighbridge is calibrated at least annually, and the site is always manned during the hours outlined in Section 2.2. The storage capacity of the site is assessed on a daily basis and waste will only be accepted if there is sufficient capacity.

3.2.2 All documentation accompanying a load will be checked on arrival at the weighbridge. If it is incorrect or the waste does not match the written description, then it will be rejected from the site. When a commercial/trade/council vehicle arrives at a weighbridge with no Waste Transfer Note (WTN), the following steps are to be taken by the weighbridge operator: -

- Advise the driver that a WTN is required for legal purposes;
- Provide a blank WTN for the driver to complete. This is their responsibility, and the weighbridge operative should not input the information for them;
- Assess the load against the information provided by the driver and discuss with the Site Manager (or equivalent);

- If waste is acceptable then it can be weighed in and recorded. A note must be made on the weighbridge software that a WTN was not present, and the commercial team should be informed so that the customer can be informed;
- If waste is not acceptable then it should be rejected, and a Load Rejection Form should be completed; and,
- All loads that are not initially accompanied by a WTN must have a note made against the accompanying entry on the weighbridge software.

3.2.3 The only exception to this approach is for vehicles that are covered by an annual WTN. In these circumstances, a copy is to be retained in the weighbridge office for reference. However, it is still the responsibility of the waste carrier to ensure that the waste is accompanied by a written description of the material.

3.2.4 Hazardous waste is not accepted at the site.

3.2.5 The weighbridge operator shall then notify the driver to proceed to the reception hall. Delivery vehicles would reverse into the reception hall via a fast-acting door. Once the door is closed, the driver would deposit the waste into a waste pit that is situated within the reception hall.

3.2.6 A site operative will visually inspect each load deposited at the waste pit. The outcome of the inspection is recorded on the Weighbridge Input Information Sheet. A copy of the relevant part(s) input load inspection record sheet should be provided once per month to each waste supplier.

3.2.7 Once tipped, if waste is as described on the documentation provided at the weighbridge, it can then be accepted and processed as specified in Section 4.2. Particular scrutiny will be paid towards loads that have been accepted at the weighbridge but were accompanied by poor documentation.

3.2.8 If tipped waste is not as described, then the load will be queried with the customer and raised with the weighbridge. A load may be contaminated with other waste types, or completely different to the description provided.

3.2.9 In either case, it will be discussed with the Site Manager (or equivalent) and the ‘new’ waste type reviewed against the Environmental Permit. Photos of any contamination or misdescription of waste should be taken and filed as supporting evidence. At this point, the commercial team (or equivalent) will be informed so that they can discuss with the customer.

3.2.10 If it is acceptable, then it can continue to be accepted, however, the weighbridge record must be amended to show the actual waste type accepted. An admin amendment may be required if the transaction has been completed.

3.2.11 The incident must be recorded on the weighbridge software and the commercial informed so that the customer can be contacted.

3.2.12 If tipped waste is not accepted, the waste rejection procedures in Section 3.3 will be adhered to.

3.2.13 All loads received at the site are recorded on SUEZ electronic weighbridge system. These records can be reviewed to provide details of all wastes present on the site at any one time and assess available storage capacity.

3.3 WASTE REJECTION

3.3.1 Any non-conforming loads will either be rejected from the site and redirected to an appropriate permitted facility or placed in a designated quarantine container, prior to removal from site. A record will be made in the Site Diary.

3.3.2 Whenever site specific acceptance criteria detailed in the contract are not met, this will be clearly communicated to the waste supplier and records of the communication shall be kept.

3.3.3 The site may cease accepting loads from a particular supplier if contamination has occurred repeatedly and the supplier has not attempted corrective action or, in the composter's opinion, the action taken has been ineffective.

3.3.4 The AD facility does not benefit from a dedicated quarantine area. A temporary quarantine area can be provided within the AD building for any loads of non-conforming waste. This area will depend upon current waste storage on site. The quarantined waste will be kept segregated from all other waste.

4.0 WASTE TREATMENT

4.0.1 The AD process can be summarised as the conversion of biodegradable material into methane (CH_4), carbon dioxide (CO_2), and water through microbial action in the absence of oxygen. Biogas consisting of mainly CH_4 and CO_2 will mainly be processed by a CHP engine to generate heat and electricity that would be used by the AD plant. Once the parasitic load has been met, any excess biogas will be processed by a gas upgrading plant to National Gas Grid criteria and injected into the gas grid via a gas main situated to the northeast corner of the site. Alternatively, excess biogas will be processed by the CHP engines to generate electricity that will be exported to the National Grid. The process is described below.

4.0.2 The AD facility can be separated into several general areas: reception, separation, anaerobic digestion, liquor treatment, biogas handling (including electricity generation), odour control, and carbon capture.

4.0.3 A simplified process flow diagram has been prepared which outlines the above operational sections. This diagram has been provided as Appendix B of this document.

4.1 RECEPTION

4.1.1 Delivery vehicles would reverse into the reception hall via a fast-acting door. Once the door is closed, the driver would deposit the waste into a waste pit that is situated within the reception hall. The pit itself is to be constructed with reinforced concrete walls and base with appropriate lining system. Within the concrete surround, the reception bunker will be formed of stainless steel with either a walking floor or screw conveyor in the bottom of the bunker transferring material to a screw conveyor which would feed the pre-treatment equipment. This will ensure that waste is processed in the order it is received (first-in, first-out). Under normal operations, the material received in the bunker would be processed within 24 hours of deposition. However, the bunker will be designed to allow a storage capacity of up to 72 hours for contingency.

4.1.2 The bunker will benefit from a sump to collect liquids. These will be pumped to the buffer tank prior to digestion. The screw conveyor motor or hydraulic pack driving the walking floor would be located within the concrete pit, but outside of the steel bunker to allow for maintenance without entering the bunker containing food waste.

4.1.3 The bunker would be emptied and cleaned periodically for inspection of the walking floor or screw conveyor. This will be done periodically in line with the manufacturer's guidance.

4.2 SEPARATION

4.2.1 Waste will be fed into a de-packaging plant which is situated within the reception hall. The plant will be designed to remove unwanted packaging and contamination (e.g., stones, glass, seeds, pips, and bones). Any packaging and contaminants which are recovered from the plant will be discharged into skips/RoRos where they will be transferred to an appropriate permitted facility for further treatment. It is envisaged that up to 162.5 tonnes of packaging and contaminants will be stored on site prior to transfer and will be stored for no longer than 7 days.

4.2.2 The waste will also be diluted with recovered water from the process, towns water and liquid waste from the food industry (as detailed in Appendix A) in order to achieve the required dry solids concentration to feed into the digestion process.

4.3 ANAEROBIC DIGESTION

4.3.1 The residual organic waste will be pumped into the hydrolysis buffer tank(s). The tank acts as a buffer between the intermittently working reception and processing halls and the continuously operating AD plant, as well as providing residence time for the enzymatic hydrolysis of fats and proteins.

4.3.2 Slurry is then pumped from the hydrolysis buffer tank to the anaerobic digesters. Three 7,800m^3 AD tanks would convert organic material to biogas (methane and carbon dioxide) by the fermentation of organic material in the absence of oxygen. The retention time of the digester is up to 60 days to maximise the biogas production and biogas is collected within the roof space, which is connected to the biogas system.

4.3.3 As part of the process, SUEZ intend to install pasteuriser tanks which may be used to heat the slurry to 70°c before it is pumped into the aerobics digesters. Alternatively, the pasteuriser tanks may be incorporated at a later stage of the AD process where it will be used to heat the material 'digestate' to 70°c for a minimum 1 hour before being pumped into the post digestion buffer tank. For both scenarios, the pasteurisation process will comprise three tanks and a heat exchanger system that will allow the following to occur simultaneously:

- One tank charging with slurry (pre-pasteurisation) or digestate (post-pasteurisation);
- One tank discharging to the digesters (pre-pasteurisation) or post digestion buffer tanks (post-pasteurisation); and,
- One tank to heat the slurry (pre-pasteurisation) or the digestate (post-pasteurisation) to 70°c for a minimum of 1 hour.

4.3.4 The material left from the process (digestate) will still be in slurry form and can be used as a fertiliser, compost or soil improver. To achieve this, the digestate will be subject to the specifications outlined in PAS 110 'Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials.'

4.3.5 At this stage, SUEZ are considering the potential options to process the digestate. The main process is to process the digestate slurry through a centrifuge where solids are dewatered to a dry solid concentration of approximately 25%. The centrifuges will be located within the main AD process building. Digested material falls by gravity into articulated trailers where it can be periodically collected and subsequently transferred off site. The trailers will have a total storage capacity of 50 tonnes. Under normal operating conditions, the maximum residence time for the digestate cake will be no longer than 24 hours before it is transferred off site. The facility would provide approximately 19,000 tonnes of digested cake per annum which would be spread to agricultural land as a soil enhancer.

4.3.6 In the event that the digestate does not meet the required specifications, the material will be stored within designated RoRos/skips inside the AD building and disposed of accordingly.

4.3.7 Alternatively, SUEZ are considering the potential to export the digestate in a slurry form and therefore would not be processed by the centrifuge. In addition, there wouldn't be a requirement to process any liquor through the wastewater treatment plant.

4.4 LIQUOR TREATMENT

4.4.1 Liquor extracted during the dewatering process (as detailed in Section 4.3.5) would gravitate to the liquor pumping sump from where it would be transported to the wastewater treatment plant on site.

4.4.2 The wastewater treatment plant is based on Membrane Bio Reactor (MBR) technology. The wastewater to be treated will be fed into an aerobic bioreactor tank for biological nitrification and carbon removal. Ammonia

nitrogen species are nitrified by autotrophic bacteria while heterotrophic aerobic organisms convert carbon to cellular biomass and part to gaseous CO_2.

4.4.3 After the biological treatment, ultra-filtration (UF) membrane separation is applied to separate the biomass from the effluent. The incoming stream with high solids (biomass) content encounters a UF membrane barrier producing a clean permeate as treated effluent and where the solids are retained in a concentrated retentate. The concentrate stream is partially returned to the process as wastewater treatment process as return activated sludge (RAS) and partially bled from the system as surplus activated sludge (SAS) to prevent a build-up of biomass in the wastewater system.

4.4.4 The remaining liquid from the treatment process is clean enough to be recirculated for washing down or within the process. Excess liquid will be discharged to sewer in accordance with a trade effluent consent. In the event that excess water cannot be discharged to sewer, arrangements will be made to tanker the wastewater to an appropriate permitted facility.

4.5 BIOGAS HANDLING

4.5.1 The biogas is captured from the AD tanks and then will mainly be processed by the CHP engine to generate heat and electricity that would be used by the AD plant. Once the parasitic load has been met, any excess biogas will be processed by a gas upgrading plant to National Gas Grid criteria. A description of the biogas upgrading process is provided in the sections below.

4.5.2 The biogas is pre-treated to partially remove water and contaminants from the biogas through a gas conditioning unit by condensation of the saturated biogas. Activated carbon is then utilised to remove hydrogen sulphide (H_2S), volatile organic compounds (VOCs) and siloxanes contaminants from the biogas.

4.5.3 The biogas is then compressed and further treated to reduce liquids (oil and water) and contaminants to protect the membranes. The biogas passes through the membrane modules separating carbon dioxide and water from methane. The methane rich low dew point (-60°C) flow exits the membrane system as product biomethane gas. Prior to injecting the biomethane into the local gas grid propane gas is added to increase the calorific value, an odorant is added in line with the local gas grid requirements and final quality is checked through a series of gas analysers. After passing the final quality control the product gas is ready to be compressed for injection into gas grid via a gas main situated to the northeast corner of the site.

4.5.4 The almost pure quality carbon dioxide-rich (typically > 98%) flow is routed to the carbon capture process (as detailed in Section 4.6). Reject gas from the Gas Entry Unit (GEU) located within a dedicated compound remote from the AD site shall either be diverted into the biogas collection system via return piping, or to a dedicated flare stack local to the GEU.

4.5.5 Any surplus biogas not utilised by the biomethane upgrading system or when the biomethane system cannot be utilised will be passed to the CHP engines or flare.

4.6 CARBON CAPTURE

4.6.1 The biogas produced by AD contains mainly methane (CH_4 - 50-70% with an average of approx. 61%) and carbon dioxide (CO_2 - 30-45% with an average of approx. 39%). As noted in Section 4.5, the biogas produced from the AD facility will be piped to a gas upgrading system which will comprise the removal of CO_2 from the biogas. The CO_2 will be routed to thee carbon capture process which will liquefy the CO_2 while recovering the residual methane (<1%) which can be returned to the biogas upgrading unit.

4.6.2 The CO_2 capture process comprises: -

- Gas compression unit;

- CO_2 filtration and drying unit;
- CO_2 liquefaction module; and,
- Storage tanks.

Gas compression

4.6.3 The first step is CO_2 liquefaction inlet pressure control which is achieved via modulating valves to ensure that the connected upstream equipment is not disturbed. A CO_2 blower will be added to increase the inlet pressure should it be required. The pressure control system is followed by a CO_2 compressor which increases the pressure to 18-20 bar; this allows the liquefaction process to take place at relative high temperatures of -20 to -25°C. The temperature increase after each compression stage is cooled by using after-coolers and a cooling module.

Filtration and drying

4.6.4 After compression, the CO_2 gas is passed through a drying and purification module which removes moisture and trace components such as VOC's and H2S. Using regeneration gas, the module can be continuously operated without replacement of filter material. When the CO_2 rich gas is conditioned, it enters the CO_2 liquefaction module.

Liquification

4.6.5 The CO_2 rich gas is first pre-cooled in a reboiler after which it is condensed into LCO_2 in the CO_2 condenser. Secondarily, the LCO_2 then enters a stripper column where it is purified by an up-flow of boil-off gas from the reboiler. The LCO_2 is collected in the reboiler sump vessel from where it is pumped into a storage tank via the CO_2 liquid pump.

Storage tanks

4.6.6 LCO_2 is stored into a storage tank ready for transfer to LCO_2 trailers for off-loading and export from site for use in manufacturing. To ensure the right quality of the LCO_2, a quality measurement system can be included in the liquid CO_2 lines and storage tanks.

4.6.7 The boil-off gas from the reboiler and stripper removes the CH_4, N_2 and O_2 impurities from the CO_2 gas which would otherwise build-up into the liquefaction plant. A purge gas line will ensure pressure control of the liquefaction module and continuously purges part of the systems volume. Careful control of the purge gas line ensures the highest possible CO_2 recovery rate.

4.6.8 A refrigerant module is included to provide the required cooling capacity to the CO_2 condenser. This closed loop refrigerant system includes the refrigerant compressor package and refrigerant condenser.

4.7 WASTE STORAGE ARRANGEMENTS

4.7.1 The following table summarises the proposed waste storage arrangements at the site.

Table 1: Storage Arrangements

Waste/Material Type	Maximum quantity on site at any given day (tonnes per day or litres per day)	Maximum time held on site (hours or days)	Location of Storage Area on site

Food waste within waste reception area	500 tonnes	72 hours	Reception Hall (as shown on Drawing Number 1452 PL100
Packaging and contaminants recovered from pre-treatment	162.5 tonnes	7 days	Pre-Treatment Area (as shown on Drawing Number 1452 PL100
Organic slurry in AD tanks	3 x 7,800m^3 tanks	60 days	Digester tanks (as shown on Drawing Number 1452 PL100)
Digestate (post digestion) prior to treatment	2 x post digestate storage tanks	72 hours	Post digestate storage tanks (as shown on Drawing Number 1452 PL100)
Digestate cake recovered from centrifuge	50 tonnes	2 weeks	Digestate out storage area (as shown on Drawing Number 1452 PL100
Biogas generated from the AD process	-	-	The biogas is captured from the AD tanks and then will mainly be processed by the CHP engine to generate heat and electricity that would be used by the AD plant. Once the parasitic load has been met, any excess biogas will be processed by a gas upgrading plant to National Gas Grid criteria and injected into the gas grid via a gas main situated to the northeast corner of the site. Alternatively, excess biogas will be processed by the CHP engines to generate electricity that will be exported to the National Grid

4.8 ODOUR CONTROL

4.8.1 Processes will be fully enclosed with an odour abatement system comprising the following: -

- The air within the building shall be treated by incorporating a background extraction system above and around the reception pit and other point sources of odour within the building at a rate of 3 air changes per hour. All of the collected air shall pass through a dust filter then deep beds of activated carbon, designed with sufficient contact time to prevent the release of odorous air. The inclusion of a dust filter enhances the effectiveness of the activated carbon.
- Air from some of the process equipment (e.g. buffer tanks, pasteurisation and storage tanks) shall also be collected and pass through an enclosed biofilter, then the dust filter and activated carbon filter. The treated air from the carbon filters will be discharged to atmosphere via an elevated vent stack.

4.8.2 Further details of the odour abatement system are provided within the Odour Management Plan, Appendix G of this Application.

5.0 EMISSIONS CONTROL

5.1 POINT SOURCE EMISSIONS TO AIR

5.1.1 The operation of the AD facility will result in new emission points to air. The location of these emission points is shown on Drawing Number SUEZ/B049185/ASE/01.

5.1.2 An Air Quality Assessment of each of these point sources, and their respective impacts, is provided within Appendix H of the environmental permit application.

5.1.3 SUEZ propose to monitor the emission points in accordance with the details provided in Table 2 below.

Table 2: Summary of Techniques for Monitoring Emissions to Air

Parameter	Limit (including unit)	Reference Period	Monitoring Frequency	Monitoring standard or method
Enclosed Biofilter Stack Emission (A1)				
Hydrogen Sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for Sampling NIOSH 6013 for analysis
Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
CHP engine stack (A2)				
Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	500 mg/Nm^3	Periodic over minimum 4-hour period	Quarterly in first year then annual	BS EN 14792
Sulphur dioxide	107 mg/Nm^3	Periodic over minimum 4-hour period	Quarterly in first year then annual	BS EN 14791
Carbon monoxide	1,400 mg/m^3	Periodic over minimum 4-hour period	Quarterly in first year then annual	BS EN 15058
Total VOCs	1,000 mg/m^3	Hourly Average	Quarterly in first year then annual	BS EN 12619:2013
Emergency Flare Stack (A3)				
Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	150 mg/m^3	Hourly Average	Annual	BS EN 14792
Carbon monoxide	50 mg/m^3	Hourly Average	Annual	BS EN 15058
Total VOCs	10 mg/m^3	Hourly Average	Annual	BS EN 12619:2013 Or BS EN 1356:2002 depending on concentration

Odour Control Emission Stack				
No parameters set.	-	-	-	-
Vents on Storage Tanks and silos				
No parameters set.	No limit set	-	-	-
Vent/open roof from aeration tank in wastewater treatment plant				
No parameters set.	No limit set	-	-	-

5.2 BIOAEROSOLS

5.2.1 Section 11.4 of the of the EA's "Biological waste treatment: appropriate measures for permitted facilities (2022)" Guidance indicates that monitoring of bioaerosols is required if the facility is within 250m of a sensitive receptor. The nearest sensitive receptors are the industrial and commercial properties to the east of Beddington Lane, approximately 30m away from the site. As such, it's considered that bioaerosol monitoring will be required.

5.2.2 A Bioaerosol Risk Assessment has been provided as Appendix J of this Environmental Permit Application.

5.3 ODOUR

5.3.1 Odour from the AD facility will be managed in accordance with an Odour Management Plan (OMP). A copy of the OMP is provided as Appendix G of the Environmental Permit Application.

5.4 PESTS

5.4.1 The risk of pests from the AD facility will be managed in accordance with the Pest Management Plan (Appendix E of the Environmental Permit Application).

5.5 NOISE AND VIBRATION

5.5.1 The EA's 'Risk assessments for your environmental permit' guidance indicates that a Noise Impact Assessment (NIA) may be required to support an environmental permit application if: -

- Your activity uses noisy plant or machinery, for example cooling equipment or fans;
- You will be doing any noisy operations, such as loading or unloading, shredding, shearing, crushing, grinding, combustion, using trommels and conveyors or moving bulk materials;
- Your activities are not contained within buildings;
- Some of your activities take place at night;
- The area where you are planning to carry out your activity is sensitive to noise, for example rural areas may have quieter background noise levels than urban areas; and,
- There are sensitive receptors close to the site, for example houses or habitats.

5.5.2 The proposal will result in new plant on the site; however, the AD facility which entails the pre-treatment of waste will be enclosed within a building. This building benefits from a fast-acting door which will be kept closed when not in use (i.e., arrival or departure of vehicles). In addition, pedestrian doors are also closed when not in direct use. The AD tanks also comprise an enclosed system which ensures minimal noise.

5.5.3 Pre-application discussions with the EA have indicated that a Noise Impact Assessment and Noise Management Plan are not required for this operation. Nevertheless, noise has been addressed as part of the Environmental Risk Assessment (Appendix D of the Environmental Permit Application).

5.6 POINT SOURCE EMISSIONS TO LAND AND WATER (INCLUDING INDIRECT DISCHARGE TO SEWER)

5.6.1 The AD process will result in a liquor that will be treated on site via a wastewater treatment plant (as detailed in Section 4.4) . Waste sludge from this process will be used to dilute the food waste entering the plant. The remaining liquid is clean enough to either be used for washing down or within the process. Excess liquid will be discharged to sewer.

5.6.2 SUEZ are engaging in communications to facilitate the discharge of leachate to sewage by determining trade effluent consent. A H1 assessment of the discharge to sewer has been prepared and has been provided as part of this application within the Environmental Risk Assessment.

5.7 FUGITIVE EMISSIONS

5.7.1 Fugitive emissions have been identified as a potential environmental risk resulting from the AD facility, as detailed in the Environmental Risk Assessment that accompanies this application as Appendix D.

6.0 PROCESS EFFICIENCY

6.1 ENERGY EFFICIENCY

6.1.1 In accordance with BAT, SUEZ will produce a documented Energy Efficiency Plan which details the energy consumption of the site's permitted activities and measures to ensure energy efficient operations. This plan will form part of the site's Integrated Management System (IMS).

6.2 RAW MATERIALS

6.2.1 SUEZ will produce a documented Inventory of Raw Materials that are currently to be used as part of the site's permitted activities. This document will form part of the site's management system.

6.3 WATER USE

6.3.1 SUEZ will produce a documented Water Savings Plan which details the water consumption of the site's permitted activities and measures to promote recirculation. This document will form part of the site's management system.

6.4 WASTE MINIMISATION, RECOVERY AND DISPOSAL

6.4.1 SUEZ will produce a documented Residues Management Plan for the site's permitted activities and aims to achieve the following: -

- Minimise the generation of residues, that is solid waste arising from the treatment of waste;
- Optimises the reuse, regeneration, recycling, or energy recovery of residues, including packaging; and,
- Ensures the proper disposal of residues where recovery is technically or economically impractical.

6.4.2 This document will form part of the site's management system.

7.0 WASTE OUTPUTS

7.1 There will be three outputs associated with the proposed AD facility.

7.2 The first output will comprise unwanted packaging and contaminants which are removed from the food waste as part of the pre-treatment process. This waste will be stored within a skip and bulked up within the pre-treatment area prior to transfer off site to an appropriate permitted facility for further treatment.

7.3 The second output will be the biogas which will mainly be processed by a CHP engine to generate heat and electricity that would be used by the AD plant. Once the parasitic load has been met, any excess biogas will be processed by a gas upgrading plant to National Gas Grid criteria and injected into the gas grid. Alternatively, excess biogas will be processed by the CHP engines to generate electricity that will be exported to the National Grid. According to the guidance provided in the Quality Protocol 'Biomethane from Waste', it's considered that the biogas will be fully recovered and therefore ceases to be waste for each end use.

7.4 The third output relates to the digestate which is generated from the main AD process. As mentioned in Sections 4.3 and 4.4, SUEZ are seeking to utilise the digestate in a slurry, solid and liquid form which can be used as a fertiliser, compost or soil improver. To achieve this, the digestate will be subject to the specifications outlined in PAS 110. If the digestate complies with PAS 110, it's considered that the digestate meets the end of waste criteria.

7.5 SUEZ will produce a documented Digestate Operational Contingency Storage Plan which will outline contingency arrangements in the event of closed land spreading periods, extreme weather conditions, site closure and disease outbreak. This document will form part of the site's management system.

7.6 In the event that the digestate does not meet the specifications of PAS 110 or there is no suitable outlet for the digestate, it's considered that the digestate is waste and therefore will need to be disposed of accordingly.

7.7 In accordance with the EA's 'Select a Waste Recovery or Disposal Method for your Environmental Permit', an assessment was undertaken to determine the environmental impact of the proposed disposal/recovery method for the following waste outputs:-

- Unwanted packaging and contaminants;
- Non-compliant/poor quality digestate; and,
- Waste effluent.

7.8 This assessment forms part of the Environmental Risk Assessment which is provided as Appendix D of the Environmental Permit application.

7.9 The results of this assessment conclude that the proposed disposal/recovery method of the above waste streams represent the lowest impact scores that may be achieved. As such, it is considered that the risk of the proposed disposal/recovery methods are low and that there is little potential to further minimise the impact of these waste streams. Consideration will be given to seeking alternative treatment and disposal routes in the future where new technologies are brought online.

8.0 GENERAL MANAGEMENT

8.1 ENVIRONMENTAL MANAGEMENT SYSTEM

8.1.1 As noted in the EA's 'Develop a Management System: Environmental Permits' guidance, all permitted facilities are required to have an Environmental Management System (EMS) to describe the procedures in place to minimise the risk of pollution from the activities covered in the environmental permit. In addition, the BAT conclusion for Waste Treatment includes a requirement for an EMS.

8.1.2 All SUEZ operations are controlled by an IMS comprising quality, environmental and health and safety requirements which are certified to ISO 14001, ISO 9001, and ISO 45001 standards.

8.1.3 The site operations have been certified to ISO 14001, ISO 9001, and ISO 45001 and operate under documented management procedures.

8.2 INSPECTION, MAINTENANCE AND MONITORING

8.2.1 SUEZ's IMS includes policies and procedures that requires all site infrastructure to be maintained in accordance with the manufacturer's guidance. SUEZ will produce a documented Site Equipment and Maintenance Plan for the site's permitted activities. This document will form part of the site's management system.

8.2.2 In addition, site staff will undertake daily inspections of the site's plant and infrastructure in accordance with SUEZ's IMS policies and procedures. These inspections will be recorded electronically on the Vision App (SUEZ internal logging system).

8.2.3 In the event that any defects are identified so that it no longer meets the required standards, necessary remedial work will be completed as soon as practicable.

8.3 ACCIDENT MANAGEMENT PLAN

8.3.1 SUEZ will produce a documented Accident Management Plan for the site's permitted activities. This document will form part of the site's management system. The Accident Management Plan will incorporate the recommendations of the DSEAR and HAZOP studies that are undertaken for the facility.

8.4 STAFF COMPETENCE

8.4.1 The facility will be managed by a Site Manager who holds a valid and relevant Certificate of Technical Competence.

8.4.2 All site operatives will be trained in relevant health, safety, and environmental issues for their role. Staff will only be permitted to undertake activities that they have been trained for. They will be made aware of the procedures they must follow in the event of an accident or incident and will be able to access any relevant documentation that they may require. All training, experience and qualifications of staff will be noted, and these records will be maintained and kept up to date.

8.4.3 Staff competence at the wider facility is current managed in accordance with the Staff Competency and Training Plan that forms part of the site's management system. This document will be updated to incorporate the competency requirements for the AD facility.

8.5 FIRE AND EXPLOSION PREVENTION

8.5.1 The EA's 'Fire prevention plans: environmental permits' guidance indicates that a Fire Prevention Plan (FPP) is only required for biowaste treatment that comprises open windrow, in-vessel composting or dry anaerobic digestion. As noted above, the proposed AD process will comprise a wet process and therefore the risk of combustion is expected to be low. This was agreed by the EA as part of their pre-application advice.

8.5.2 Nevertheless, the risk of fire has been addressed as part of the Environmental Risk Assessment (Appendix D of the Environmental Permit Application) and the Accident Management Plan that forms part of the site's management system.

8.5.3 In addition to the above, a Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) assessment will be undertaken for the AD facility and will form part of the site's management system.

8.6 RECORD KEEPING

8.6.1 As mentioned above, all SUEZ operations are controlled by an IMS which includes procedures for the management of documentation.

9.0 BAT ASSESSMENT

9.0.1 The following table sets out the BAT requirements as set out in the European Commission's BAT Conclusion for Waste Treatment and demonstrates how SUEZ will meet these requirements for the AD facility.

Table 3: BAT Assessment

BAT Conclusion	BAT Justification
Environmental Management System	
BAT 1 – In order to improve the overall environmental performance, BAT is to elaborate and implement an environmental management system (EMS) that incorporates all of the following features: i. commitment of the management, including senior management; ii. definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation iii. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment iv. implementation of procedures paying particular attention to: a) structure and responsibility, b) recruitment, training, awareness and competence c) communication d) employee involvement e) documentation f) effective process control g) maintenance programmes h) emergency preparedness and response i) safeguarding compliance with environmental legislation; v. checking performance and taking corrective action, paying particular attention to: a) monitoring and measurement (see also the JRC Reference Report on Monitoring of emissions to air and water from IED installations – ROM) b) corrective and preventive action c) maintenance of records d) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; vi. review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness	As mentioned in Section 8.1, all SUEZ operations are controlled by an IMS comprising quality, environmental and health and safety requirements which are certified to ISO 14001, ISO 9001, and ISO 45001 standards.

vii. following the development of cleaner technologies; viii. consideration for the environmental impacts from the eventual decommissioning of the plant at the stage of designing a new plant, and throughout its operating life; ix. application of sectoral benchmarking on a regular basis; x. waste stream management (see BAT 2); xi. an inventory of waste water and waste gas streams (see BAT 3); xii. residues management plan (see description in Section 6.5); xiii. accident management plan (see description in Section 6.5); xiv. odour management plan (see BAT 12); xv. noise and vibration management plan (see BAT 17)	
Environmental Performance	
BAT 2 – In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below. a) Set up and implement waste characterisation and pre-acceptance procedures; b) Set up and implement waste acceptance procedures c) Set up and implement a waste tracking system and inventory d) Set up and implement an output quality management system e) Ensure waste segregation f) Ensure waste compatibility prior to mixing or blending of waste g) Sort incoming solid waste	For points a) to c), please refer to Section 3 of this document which details the waste acceptance procedures for the AD facility. For Point d), some of the outputs will be subject to specific end uses and therefore will be required to meet specific criterion. For example, the biogas will be processed by the upgrading plant to meet the National Grid Gas Criteria before it is injected into the gas grid via the gas main situated to the northeast corner of the site. In addition, it is proposed that the digestate cake will be used as a soil enhancer and therefore will be subject to the requirements of PAS 110:2014 titled 'Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials.' As mentioned above, all SUEZ operations are controlled by an accredited IMS which meets the

	requirements of ISO 9001. As such, quality control of the outputs will be managed in accordance with the documented procedures of the IMS. For points e), f) and g), all incoming waste will be subject to pre-treatment which will comprise a de-packaging plant remove unwanted packaging and contamination (e.g., stones, glass) from the waste.
BAT 3 – In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of wastewater and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all the following features: (i) information about the characteristics of the waste to be treated and the waste treatment processes, including: (a) simplified process flow sheets that show the origin of the emissions; (b) descriptions of process-integrated techniques and wastewater/waste gas treatment at source including their performances; (ii) information about the characteristics of the waste water streams, such as: (a) average values and variability of flow, pH, temperature, and conductivity; (b) average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances/micropollutants); (c) data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)) (see BAT 52); (iii) information about the characteristics of the waste gas streams, such as (a) average values and variability of flow and temperature;	All SUEZ operations are controlled by an accredited IMS which meets the requirements of ISO 14001. Based on the requirements of the ISO 14001 standard, SUEZ are required to monitor and review their environmental performance which includes aspects such as water, energy, raw material consumption and waste generation. Furthermore, there is a requirement under the Environmental Permit for the reporting of key indicators such as discharge to sewer, water usage and energy usage. Activities associated with the proposed AD facility will be reported with these forms which allows year on year monitoring of key performance indicators.

(b) average concentration and load values of relevant substances and their variability (e.g. organic compounds, POPs such as PCBs); (c) flammability, lower and higher explosive limits, reactivity; (d) presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, nitrogen, water vapour, dust).	
Storage of Waste	
BAT 4 – In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of techniques given below. a) Optimised storage location b) Adequate storage capacity c) Safe storage operation d) Separate area for storage and handling of packaged hazardous waste	SUEZ will produce a documented Waste Storage Plan for the site's permitted activities. This document will form part of the site's management system.
Handling and Transfer of Waste	
BAT 5 - In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.	Waste for the AD facility will be tipped directly into the reception pit. The reception bunker will be formed of stainless steel with either a walking floor or screw conveyor in the bottom of the bunker transferring material to a screw conveyor which would feed the pre-treatment equipment. This will ensure that waste is processed in the order it is received (first-in, first-out). The bunker will benefit from a sump to collect liquids. These will be pumped to the buffer tank prior to digestion. The screw conveyor motor or hydraulic pack driving the walking floor would be located within the concrete pit, but outside of the steel bunker to allow for

	maintenance without entering the bunker containing food waste. The whole AD process will be undertaken within an enclosed building which benefits from a fast-acting doors which will be kept closed when not in use (i.e., arrival or departure of vehicles). In addition, pedestrian doors are also closed when not in direct use. This will minimise the potential for any odour, noise and dust generated on site to impact receptors beyond the site boundary. Any gases that are produced from the AD process will be produced within a sealed network and piped to tanks for storage prior to use by the gas upgrading plant or CHP engine. The building will also benefit from an odour control system which will be designed to extract and treat any odour emissions that may be generated from the AD process. Details regarding the odour control system are provided in the OMP (Appendix G of the Environmental Permit Application).
Monitoring	
BAT 6 - For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation).	As mentioned in Section 4.4, the AD process will result in a liquor that will be treated on site via a wastewater treatment plant via a wastewater treatment plant to reduce the

BAT 7 - BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	Chemical Oxygen Demand, oxidise ammonia to nitrate and correct pH. As mentioned in Section 4.4, waste sludge from this process will be used to dilute the food waste entering the plant. The remaining liquid is clean enough to either be used for washing down or within the process. Excess liquid will be discharged to sewer. The remaining liquid is clean enough to either be used for washing down or within the process. Excess liquid will be discharged to sewer in accordance with a trade effluent consent. In the event that excess water cannot be discharged to sewer, arrangements will be made to tanker the wastewater to an appropriate permitted facility. SUEZ are engaging in communications to facilitate the discharge of leachate to sewage by determining trade effluent consent. As such, monitoring will be undertaken in accordance with trade effluent consent.
BAT 8 - BAT is to monitor channelled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	Please refer to Section 5.1 of this document which details the proposed monitoring arrangements for all emission points to air from the proposed AD facility.
BAT 9 - BAT is to monitor diffuse emissions of organic compounds to air from the regeneration of spent solvents, the decontamination of equipment containing POPs with solvents, and the physico-chemical treatment of solvents for the recovery of their calorific value, at least once per year using one or a combination of the techniques given below.	
BAT 10 - BAT is to periodically monitor odour emissions	

BAT 11 - BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and wastewater, with a frequency of at least once per year.	As mentioned above, SUEZ hold an accredited IMS which meets the requirements of ISO 14001. Based on the requirements of the ISO 14001 standard, SUEZ are required to monitor and review their environmental performance which includes aspects such as water, energy, raw material consumption and waste generation. Furthermore, there is a requirement under the Environmental Permit for the reporting of key indicators such as discharge to sewer, water usage and energy usage. Activities associated with the proposed SUEZ facility will be reported with these forms which allows year on year monitoring of key performance indicators.
Emissions	
BAT 12 - In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements: - a protocol containing actions and timelines; - a protocol for conducting odour monitoring as set out in BAT 10; - a protocol for response to identified odour incidents, e.g. complaints; - an odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures.	As mentioned in Section 5.3, odour from the AD facility will be managed in accordance with an OMP. A copy of the OMP is provided as Appendix G of the Environmental Permit Application
BAT 13 - In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below. a) Minimising residence time b) Using chemical treatment	

c) Optimising aerobic treatment	
BAT 14. In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below. a) Minimising the number of potential diffuse emissions sources b) Selection and use of high integrity equipment c) Corrosion Prevention d) Containment, collection and treatment of diffuse emissions e) Dampening f) Maintenance g) Cleaning of waste treatment and storage areas h) Leak detection and repair programme	Fugitive emissions have been identified as a potential environmental risk resulting from the AD facility, as detailed in the Environmental Risk Assessment that accompanies this application as Appendix D.
BAT 15 – BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques given below.	Biogas which is generated from the AD process which will mainly be processed by a CHP engine to generate heat and electricity that would be used by the AD plant. Once the parasitic load has been met, any excess biogas will be processed by a gas upgrading plant to National Gas Grid criteria and injected into the gas grid. Alternatively, excess biogas will be processed by the CHP engines to generate electricity that will be exported to the National Grid. Flaring will only be used for emergencies.
BAT 16. In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below.	
Noise	
BAT 17 - In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements: i. a protocol containing appropriate actions and timelines; ii. a protocol for conducting noise and vibration monitoring; iii. a protocol for response to identified noise and vibration events, e.g. complaints;	According to the BAT conclusion, BAT 17 and 18 is only applicable to cases where noise nuisance at sensitive receptors is expected and/or has been substantiated. The proposed SUEZ activity will be undertaken within the confines of a building. This building benefits from a fast-acting doors which will be

iv. a noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures	kept closed when not in use (i.e., arrival or departure of vehicles). In addition, pedestrian doors are also closed when not in direct use.
BAT 18 - In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below. a) Appropriate location of equipment and buildings b) Operational measures c) Low noise equipment d) Noise and vibration control equipment e) Noise attenuation	All noise generating activity will be confined to the hours set out in Section 2.2 of the BATOT with the exception of emergency repairs. The site is located in an active industrial area adjacent to the Beddington Lane Industrial Estate and Beddington Water Treatment Works which are unlikely to be susceptible to the noise generated by vehicles visiting the site.
Emissions to Water	
BAT 19. In order to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below. a) Water Management b) Water Recirculation c) Impermeable Surface d) Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels e) Roofing of waste storage and treatment areas f) Segregation of water streams g) Adequate drainage infrastructure h) Design and maintenance provisions to allow detection and repair of leaks i) Appropriate buffer storage capacity	As mentioned in Section 6.3, SUEZ will produce a documented Water Savings Plan for the site's permitted activities. This document will form part of the site's management system.
BAT 20. In order to reduce emissions to water, BAT is to treat waste water using an appropriate combination of the techniques given below. a) Equalisation b) Neutralisation	As mentioned in Section 4.4, the AD process will result in a liquor that will be treated on site via a wastewater treatment plant. As mentioned in Section 4.4, waste sludge from this process will be used to dilute the food

c) Physical separation, e.g. screens, sieves, grit separators, grease separators, oil-water separation or primary settlement tanks d) Adsorption e) Distillation/rectification f) Precipitation` g) Chemical oxidation h) Chemical reduction i) Evaporation j) Ion exchange k) Stripping l) Activated sludge process m) Nitrification/denitrification when the treatment includes a biological treatment n) Coagulation and flocculation o) Sedimentation p) Filtration (e.g. sand filtration, microfiltration, ultrafiltration) q) Flotation	waste entering the plant. The remaining liquid is clean enough to either be used for washing down or within the process. Excess liquid will be discharged to sewer in accordance with a trade effluent consent.
Emissions from Accidents and Incidents	
BAT 21 - In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below, as part of the accident management plan (see BAT 1). a) Protection measures b) Management of incidental/accidental emissions c) Incident/accident registration and assessment system	As mentioned in Section 8.3, SUEZ produce a documented Accident Management Plan for the site's permitted activities. This document will form part of the site's management system.
Material Efficiency	
BAT 22. In order to use materials efficiently, BAT is to substitute materials with waste.	It is proposed that the digestate produce from the AD process will be used as fertiliser in order to facilitate the efficient use of materials and reduce waste materials produced from the facility.
Energy Efficiency	

BAT 23 - In order to use energy efficiently, BAT is to use both of the techniques given below. a) Energy efficiency plan b) Energy balance record	As mentioned in Section 6.1, SUEZ will produce a documented Energy Efficiency Plan for the site's permitted activities. This document will form part of the site's management system.
Reuse of Packaging	
BAT 24 - In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the residues management plan (see BAT 1).	The AD facility will predominantly treat organic food waste which may contain fractions of packaging that are not suitable for AD. As such, the waste will be subject to a pre-treatment process, which includes a de-packaging plant to remove unwanted packaging and contamination from the waste. As such, the potential to maximise reuse of packaging at the AD facility is considered to be low. Nevertheless, SUEZ will prepare a documented Residues Management Plan which will form part of the site's management system.
BAT Conclusions for the Biological Treatment of Waste	
Emissions to Air	
BAT 34 - In order to reduce channelled emissions to air of dust, organic compounds and odorous compounds, including H2S and NH3, BAT is to use one or a combination of the techniques given below. a) Biofilter b) Fabric filter c) Thermal Oxidation d) Wet scrubbing	The AD facility will benefit from an odour control system. Details regarding the odour control system are provided in Section 4.8.
Emissions to Water and Water Usage	

BAT 35. In order to reduce the generation of waste water and to reduce water usage, BAT is to use all of the techniques given below. a) Segregation of water streams b) Water recirculation c) Minimisation of the generation of leachate	As mentioned in Section 6.3, SUEZ will produce a documented Water Savings Plan for the site's permitted activities. This document will form part of the site's management system.
BAT Conclusions for the Anaerobic Treatment of Waste	
Emissions to Air	
BAT 38. In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.	The AD plant will benefit from an appropriate monitoring system to: • Ensure a stable digester operation • Minimise operational difficulties, such as foaming, which may lead to odour emissions • Provide sufficient early warning of system failures which may lead to a loss of containment and explosions. In addition, the monitoring system will be designed to monitor and/or control of the following waste and process parameters: • pH and alkalinity of the digester feed; • Digester operating temperature; • Hydraulic and organic loading rates of the digester feed; • Concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate;

- Biogas quantity, composition (e.g. H_2S) and pressure;
- Liquid and foam levels in the digester.

SUEZ will aim to minimise operational difficulties, such as foaming, through features such as an automatically controlled mixing management system. This system includes active torque monitoring to detect changes in operating conditions and substrate characteristics, this will react dynamically in order to regulate changes, thus mitigating potential foaming.

Whilst the site design has not yet been finalised, similar to the Ellington Road AD facility, it is anticipated that the proposed AD facility at Beddington Lane will utilise a Supervisory Control and Data Acquisition (SCADA) system for monitoring and controlling physical processes, which serves as a critical component of the system, notifying operators of abnormal conditions or events that require attention.

This interface will have three different alarm types, these are as follows: -

- Warning Alarms: Indicate that a process is approaching a critical limit.

- Critical Alarms: Signal that a process has exceeded a critical limit and requires immediate action.
- System Alarms: Related to the SCADA system itself, such as communication failures or hardware malfunctions.

The system will provide early warning of potential system failures and prioritises such based on their severity and the potential impact on safety, operations, and the environment. This data will be presented on the SCADA interface which will enable operators to view real-time data, alarm status, and relevant information to help make informed decisions. Furthermore, site operators will be able to set the system up to include pre-defined response protocols for each alarm level, which is capable of guiding the operator on the appropriate actions to take when an alarm is triggered. The system will be set to record alarms for historical analysis which can benefit long term performance monitoring.

As well as an on-site warning system, the SCADA interface can send alarms via text and email to the relevant numbers to provide early notification. Overall, the SCADA system will play a vital role in ensuring safe and efficient operation of industrial processes by providing

	timely notifications of issues that need to be addressed.

DRAWINGS

Proposed Site Layout – 1452 PL100

Boundary Plan - SUEZ/B042242/PER/01

Air Source Emissions Plan - SUEZ/B049185/ASE/01

APPENDIX A - WASTE TYPES

Table A1: Waste Types for Anaerobic Digestion Plant

Waste Code	Description
02	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing.**
02 01	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing**
02 01 01	Sludges from washing and cleaning – vegetables, fruit and other crops
02 01 02	Animal tissue waste
02 01 03	Plant tissue waste
02 01 06	Animal faeces, urine and manure (including spoiled straw) only
02 01 07	Wastes from forestry
02 01 99	Wastes not otherwise specified – spent mushroom compost from commercial mushroom growing only
02 02	**Wastes from the preparation and processing of meat, fish and other foods of animal origin**
02 02 01	Sludges from washing and cleaning
02 02 02	Animal tissue waste
02 02 03	Materials unsuitable for consumption or processing
02 02 04	Sludges from on-site effluent treatment
02 02 99	Sludges from gelatine production and animal gut contents only
02 03	**Wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation**
02 03 01	Sludges from washing, cleaning peeling, centrifuging and separation (including sludge from production of edible fats and oils, seasoning residues, molasses residues, residues from production of potato, corn or rice starch only)
02 03 04	Materials unsuitable for consumption or processing
02 03 05	Sludges from on-site effluent treatment
02 04	**Wastes from sugar processing**
02 04 01	Soils from washing and cleaning beet
02 04 03	Sludges from on-site effluent treatment
02 04 99	Other biodegradable wastes, allowed only if no chemical agents added and no toxin residues
02 05	**Wastes from the dairy products industry**
02 05 01	Wastes from the dairy products industry
02 05 02	Sludges from on-site effluent treatment
02 06	**Wastes from the baking and confectionery industry**
02 06 01	Materials unsuitable for consumption or processing

02 06 03	Sludges from on-site effluent treatment
02 07	**Wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)**
02 07 01	Wastes from washing, cleaning and mechanical reduction of raw materials
02 07 02	Wastes from spirits distillation
02 07 04	Materials unsuitable for consumption or processing
02 07 05	Sludges from on-site effluent treatment – sludges from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)
02 07 99	• Malt husks, malt sprouts, malt dust • Spent and sludge from breweries • Sludge from wine making Waste types in this section allowed if biodegradable material only, no chemical agents added
04	**WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRIES**
04 02	**Waste from the textile industry**
04 02 10	Organic matter from natural products such as grease and wax
07	**WASTE FROM ORGANIC CHEMICAL PROCESSES**
07 01	**Wastes from the manufacture, formulation, supply and use of basic organic chemicals**
07 01 08	Glycerol waste from bio-diesel manufacture from non-waste vegetable oils
15	**WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED**
15 01	**Waste packaging, absorbents, filter materials, wiping cloths and protective clothing**
15 01 01	Paper and cardboard packaging (excluding veneers, plastic coatings or laminates) certified to EN 13432 or equivalent certified compostable standard
15 01 02	Plastic packaging – compostable plastics only certified to EN 13432 or equivalent certified compostable or digestible standard
15 01 03	Wooden packaging – virgin timber only
15 01 05	Composite packaging meeting EN 13432 or equivalent certified compostable or digestible standard
15 02	**Absorbents, filter materials, wiping cloths and protective clothing**
15 02 03	Absorbents, filter materials and cloths from the production of alcoholic and non-alcoholic beverages other than those mentioned in 15 02 02 made from compostable material only
16	**WASTES NOT OTHERWISE SPECIFIED IN THE LIST**
16 10	**Aqueous liquid waste destined for off-site treatment**
16 10 02	Untreated wash waters from cleaning fruit and vegetables on farm only
16 10 02	Milk and dairy waste milk from agricultural premises only
16 10 02	Liquor or leachate from a composting process that accepts waste input types listed in these standard rules or composting and anaerobic digestion standard rules only and in compliance with Animal By Products Regulations

19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 02	**Wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation**
19 02 03	Premixed wastes composed from waste listed within these standard rules only
19 02 06	Sludge types from waste listed within this table that have been heat treated only
19 02 06	Sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge which has been previously pasteurised and stabilised only)
19 02 10	Glycerol not designated as hazardous – excludes 19 02 08
19 05	**Wastes from anaerobic treatment of solid wastes**
19 05 99	Waste types in this section are allowed only if derived from input types allowed by the Anaerobic Digestion Quality Protocol
19 06	**Wastes from anaerobic treatment of waste**
19 06 03	Liquor from anaerobic treatment of municipal waste (from a process that treats wastes which are listed in this table only)
19 06 04	Digestate from anaerobic treatment of source segregated biodegradable waste (from a process that treats wastes which are listed in this table only)
19 06 05	Liquor from anaerobic treatment of animal and vegetable waste (from a process that treats wastes which are listed in this table only)
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste (from a process that treats wastes which are listed in this table only)
19 08	**Wastes from wastewater treatment works**
19 08 09	Grease and oil mixture from oil and water separation containing only edible oils and fats
19 08 12	Sludges from biological treatment of industrial waste water (from a process that treats wastes which are listed in these standard rules only)
19 12	**Waste from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 01	**separately collected fractions (except 15 01)**
20 01 01	Paper and cardboard (excluding veneers, plastic coatings or laminates) meeting EN 13432 or equivalent certified compostable or digestible packaging only
20 01 08	Biodegradable kitchen and canteen waste
20 01 25	Edible oil and fat
20 02	**Garden and park wastes (including cemetery waste)**
20 02 01	Biodegradable waste
20 03	**Other municipal wastes**

20 03 01	Mixed municipal waste
20 03 02	Waste from markets

APPENDIX B – PROCESS FLOW DIAGRAM