NON-TECHNICAL SUMMARY

Crompton Road, Ilkeston, Derbyshire

Stanton Energy Ltd

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1.0	15/01/2021	IA	--	Initial Draft
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1.2	11/03/2021	IA	--	Application Submission
1.3	27/05/2021	IA	--	Updates in line with EA comments

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1 Introduction

1.1 This Non-Technical Summary (NTS) accompanies an Environmental Permit (EP) application for a non-hazardous waste installation for biological treatment submitted on behalf of Stanton Energy Ltd (the operator).

1.2 The site will be situated at Crompton Road, Ilkeston, Derbyshire and the National Grid Reference for the site is SK 47999 39325**.**

1.2.1 The application site is located on part of the former Stanton Ironworks at the southern end of the Crompton Road industrial complex. It is currently operated as a composting site contained within a larger waste management site.

1.3 Access to the site is gained via Merlin Way/Crompton Road and a short length of private track. The site is bordered by waste activities to the north, south and west. To the east of the site is the Erewash Canal with Sewage Treatment works beyond.

2 Application proposals

2.1 Stanton Energy Ltd will hold and operate an Installation Environmental Permit (EP) for the following activities:

- Biological treatment of non-hazardous waste (referenced as 1.16.2.1 of the EPR 2019 charging tables).

2.2 The Environmental Permit is required for the storage (keeping) prior to processing/treatment (all types of handling/processing) of waste feedstock. The throughput of the site will not exceed 83,000 tonnes per annum of the following waste feedstocks:

2.3 The initial feedstocks that will be used within the process are detailed below:

Feedstock	Initial plan (tpa)	Max (tpa)
Manure	1,500.00	5,000
maize silage	5,000.00	25,000
grass silage	3,500.00	10,000
green waste	15,750.00	18,000
food waste	9,600.00	18,000
Grease	600.00	2,000

2.4 Future feedstocks have been identified which could be available; these are detailed below:

Feedstock	Max (tpa)
Brewery Waste – Waste beer, spent grains & hops	10,000
Filtrate from a press process (Castle Environmental)	15,000
Contraband material – Tobacco, Alcohol	7,500
Vegetables	10,000
Dairy	8,000
Bakery	8,000
Kerbside collected food waste	8,000

2.5 The above tonnages are a maximum and it must be noted that it is unlikely that the site would be accepting each of these waste streams at the same time as the plant is

only capable of processing 160 tonnes per day and therefore the overall annual tonnage will be significantly lower than max capacity of each feedstock.

2.6 A full Waste Inventory has been detailed within Document 003-058-O.

2.7 Specified waste management activities and associated limits (including waste disposal and waste recovery operations) are listed in the table below:

Activities	
Description of activities for waste operations	**Limits of activities**
R1: Use principally as a fuel or other means to generate energy R3: Recycling/reclamation of organic substances which are not used as solvents R5: Recycling/reclamation of other inorganic materials R13: Storage of waste pending any of the operations numbered R1 to R12 D10: Incineration on land	Anaerobic digestion and the following associated activities: • Physical treatment of waste including shredding, sorting, screening, compaction, baling, mixing and maceration • Waste pasteurisation and chemical addition • Gas cleaning and upgrading to biomethane • Gas storage and drying • Treatment of digestate including screening to remove plastic residues, centrifuge or pressing, addition of thickening agents (polymers) or drying (other than for the purpose of use as a fuel) • Maturation of digestate • Use of an auxiliary flare required only for short periods of breakdown or maintenance of the facility • Use of pressure release valves to protect the integrity of the plant. Such systems should not be used routinely to vent unburnt biogas. The total quantity of waste or a combination of waste and non-waste including solids and liquids accepted at the site shall not exceed 83,000 tonnes a year. The maximum quantity of hazardous waste received, stored and treated shall not exceed 10 tonnes per day.

3 Proposed EWC codes

3.1 The table below details the proposed EWC codes which the site will accept, store and process:

Table 3.1 – Proposed EWC Codes

Permitted waste types and quantities	
Maximum Quantities	**The total quantity of waste accepted for activity shall be less than 83,000 tonnes a year.**
Waste Code	**Description**
02	**Wastes resulting from exploration, mining, quarrying and physical and chemical treatment of minerals**
02 01	**waste 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, manure (including spoiled straw) only
02 01 07	wastes from forestry
02 01 99	residues from commercial mushroom cultivation
02 02	**waste from 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, animal gut contents
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
02 03 02	wastes from preserving agents
02 03 04	materials unsuitable for consumption or processing
02 03 05	sludges from on-site effluent treatment
02 03 99	sludge from production of edible fats and oils to include seasoning residues, molasses residues, residues from production of potato, corn or rice starch
02 04	**wastes from sugar processing**
02 04 03	sludges from on-site effluent treatment
02 04 99	other biodegradable wastes
02 05	**wastes from the dairy products industry**
02 05 01	materials unsuitable for consumption or processing
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

Permitted waste types and quantities	
Maximum Quantities	**The total quantity of waste accepted for activity shall be less than 83,000 tonnes a year.**
Waste Code	**Description**
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
02 07 99	spent grains, hops and whisky filter sheets/ cloths, yeast and yeast like residues, sludge from production process
03	**Wastes resulting from exploration, mining, quarrying and physical and chemical treatment of minerals**
03 03	**wastes from pulp, paper and cardboard production and processing**
03 03 02	green liquor sludge (from recovery of cooking liquor)
03 03 08	wastes from sorting of paper and cardboard destined for recycling.
03 03 10	fibre rejects fibre -, filler - and coating from mechanical separation
04	**Wastes resulting from leather, fur and textile industires**
04 01	**Wastes from the leather and fur industry**
04 01 01	fleshings and lime split wastes
04 01 05	tanning liquor free of chromium
04 01 07	sludges, in particular from on-site effluent treatment free of chromium
04 02	**waste from the textile industry**
04 02 10	organic matter from natural products, e.g. grease, wax
07	**Wastes from organic process**
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 only
15	**Waste packaging**
15 01	**Waste packaging, absorbents, filter materials, wiping cloths and protective clothing**
15 01 01	paper and cardboard packaging
15 01 02	biodegradable plastic packaging
15 01 03	wooden packaging
15 01 04	Metallic packaging
15 01 05	composite packaging
16	**Wastes not otherwise specified in the list**
16 03	**aqueous liquid wastes destined for off-site treatment**
16 03 05*	organic wastes containing hazardous substances
16 10	**aqueous liquid wastes destined for off-site treatment**
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01
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 physiochemical treatments of waste**

Permitted waste types and quantities	
Maximum Quantities	**The total quantity of waste accepted for activity shall be less than 83,000 tonnes a year.**
Waste Code	**Description**
19 02 03	premixed wastes composed only of non-hazardous wastes
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09
19 05	**waste from aerobic treatment of solid wastes**
19 05 01	non-composted fraction of municipal and similar wastes
19 05 02	non-composted fraction of animal and vegetable waste
19 05 03	off-specification compost
19 05 99	composting liquors
19 06	**wastes from anaerobic treatment of waste**
19 06 03	liquor from anaerobic treatment of municipal waste
19 06 04	digestate from anaerobic treatment of municipal waste
19 06 05	liquor from anaerobic treatment of animal and vegetable waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 08	**wastes from wastewater treatment works**
19 08 09	grease and oil mixture from oil/water separation containing only edible oils and fats
19 08 12	sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11
19 12	**wastes 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	**municipal wastes including separately collected fractions**
20 01 01	paper and cardboard
20 01 08	biodegradable kitchen and canteen waste
20 01 25	edible oil and fat
20 01 38	wood other than that mentioned in 20 01 37
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	wastes from markets

4 AD Plant Process

4.1.1 AD is a biological process, which breaks down organic matter within biodegradable wastes in the absence of oxygen, through the actions of a variety of micro-organisms. The result of these processes is the production of biogas, which consists predominantly of methane (CH_4) and carbon dioxide (CO_2) and a useable digestate product which has environmental benefits when used in place of fertilisers.

4.1.2 The AD plant will replace part of an existing compost facility; given that the majority of the waste processed at the site is contained within tanks and/or benefits from odour abatement the operation will significantly reduce potential for odour compared to that which has potential to arise from the existing composting facility, since the process will utilise green wastes which are currently composted in the open.

4.1.3 The initial feedstock menu will be made up of the following materials:

- Manure
- Grass and Maize Silage
- Green waste
- Food waste
- Grease

4.1.4 In addition to the above the site may also accept the following feedstocks:

- Brewery Waste
- Filtrate from press process
- Contraband Material (Tobacco Material)
- Vegetables
- Dairy
- Bakery
- Kerbside food waste

4.1.5 Reference should be made to the site layout plan (Drawing Nos. 058-003-03) for illustration of plant/structures on-site.

4.1.6 In the biogas installation, several sections can be distinguished:

- Reception and storage of solid & liquid products;
- Feeding of solid products;
- Primary digester(s);
- Secondary digester;
- Digestate treatment;
- Sanitation;
- Upgrading; and,
- Heat distribution.

4.1.7 The site layout includes three large tanks, two being digester tanks with the other being an after-digester storage tank.

4.1.8 A solid feeding system will feed the feedstock, consisting of green waste, silage, manure and digestate into the system, whereas the grease and food waste will be fed into the liquid input system by being pumped directly from the tanker lorries that transport the material to the site into the 2 x 100m^3 polyester silos.

4.1.9 The digesters are liquid and gas insulated concrete tanks with paddle mixers and submergible mixers which are used for mixing the feedstock in the digester for the:

- elimination of floating layers;
- elimination of sedimentation;
- elimination of temperature gradients;
- elimination of density gradients;
- better gas release from the substrate;
- mixing of fresh substrate with already existing substrate.

4.1.10 Within the digester, the substrate is digested on a mesophilic (about 36-40°C) temperature level. The content of the digester is heated by a series of heating rings in the digester. Through the heating rings hot water is pumped. The heating rings have a sufficient heat capacity for heating up the materials and to lift the heat losses of the tank. The walls and floor of the digestion tank are insulated to prevent a temperature gradient and restrict heat losses to the surroundings at low ambient temperatures.

4.1.11 The primary digester comprises integrated gas storage, in which the biogas that is formed can be collected. The gas storage consists of an inner and outer membrane that is clamped down ensuring that the digester is gas tight.

4.1.12 The secondary digester comprises an integrated desulphurization unit where biogas will be cooled, compressed and cleaned to approximately 0-200ppm using desulphurization bacteria i.e. ferric chloride dosing and active carbon filtration to further remove any residual contaminants. The desulphurization bacteria have to be fed with maximal 4% air compared to the biogas production.

4.1.13 After the primary and secondary digester, the digestate is sanitized. The digestate has to be sanitized batch wise at 70°C for 1 hour according to PAS 110. The digestate will be pre-heated in the pre-heating buffer and sanitized in the pasteurisation tank. The agitator fitted to the pasteurisation tanks will keep the product homogenous and ensure good heat transfer. The produced heat from one of the two 499 kWth wood-fired biomass boilers will be used to heat the materials and retain the required temperature for required time in the tanks.

4.1.14 Digestate from the secondary digestion tanks is treated by a decanter which separates the digestate into a thick and thin fraction. The thick fraction will comprise predominantly soil type materials, whilst the thin fraction will either be partly re-used to dilute the digestion process or pumped to the after storage tank.

4.1.15 The digestate of the secondary digester is led to the after-digester tank which is fitted with a mixer. The tank is installed to provide extra storage capacity for the digestate.

4.1.16 Gas management and grid connection equipment will be located at the western area of the site. The gas generated by the facility, after cleaning, will be exported to the grid and the grid entry unit will be located in the site's south western corner.

4.1.17 The entire system is continuously monitored and controlled via the control cabinet (SCADA System). Details of the SCADA system are shown in Appendix IV of this OMP.

4.1.18 In terms of the receipt and preparation of feedstock, the green waste will be brought to the site in accordance with existing arrangements at the adjacent waste facility and shredded in preparation to being fed into the feeding system and into the digestate tanks. The food waste and grease components of the feedstock will be delivered to the site ready to feed into the system directly via the liquid input points. These components will be delivered in tankers and pumped directly into the tanks via an enclosed system to avoid any odour issues. Silage and manure will be sourced from local farms and the digestate will be sourced from the digestion process.

4.1.19 The main by-product that will result from the process will be digestate. This is subject to a decanter process to produce a soil conditioner/fertiliser, a proportion of which will be re-used in the digestion process, the remainder of which will be taken off site for use in agricultural applications. A small portion of the thin fraction will be discharged to sewer.

4.1.20 The plant will re-circulate around 34,000 tonnes of the digestate produced by the digestion process.

4.1.21 A safety flare will be used to safely combust biogas during start up, in the event of an excess of biogas or periods of maintenance. It is anticipated that the flare will be operational for <10% of each year.

4.1.22 Two biomass boilers will be used to provide heat for the process, fuelled by virgin timber. These fall under permitting thresholds, each having a rated thermal input of 534KW. Therefore, these will be a Directly Associated Activity to the process.

5 Digestate Process/Treatment

5.1 Liquid digestate from the digestion process will be retained for as long as possible within the primary digesters. Digestate from the primary digesters will be pumped to the secondary digester in order to maximise insofar as possible the yield.

5.2 The liquid digestate and substrate will then discharge from the secondary digestate tank to a heating buffer tank via a cutter skid in order to mulch any remaining solid fragments into the liquid digestate. The preheated digestate will then be pumped into the pasteurisation tank where it will be hearted to at least 70 degrees Celsius for a period of at least one hour.

5.3 The pasteurised digestate will then be pumped to a buffer tank to allow for settlement of solids. The thin (liquid) fraction of the digestate from the upper part of the buffer tank will discharge directly to the after-storage tanks. The remainder of the digestate in the buffer tank will be pumped to a decanter where it will be separated into a thin fraction which will be pumped as above to the after storage tanks, and a thick fraction which will comprise predominantly soil type materials. The decanter will comprise a centrifuge comprising a rotating Archimedes Screw with the digestate being pumped under pressure against the direction of rotation of the Archimedes screw. Provided that the pressure and the rotation of the Archimedes screw are calibrated correctly, it is likely that almost all of the suspended matter within the digestate will be separated into the thick fraction. The fully treated thin fraction will be stored pending removal from site for use after meeting the end of waste criteria, or in exceptional circumstances discharged from the after storage tanks to foul sewer. Any gas accumulating in the after storage tanks will be re-circulated back into the primary digestion tanks. The thick fraction will be removed from site for use after meeting the end of waste criteria.

5.4 It is likely also that a significant proportion of any of the nutrients causing a high chemical oxygen demand within the digestate will sorb onto the surface of finer suspended particles and thus be removed from the thin fraction. It is therefore likely

that there will be a significant release of hydrogen gas from the digestate stored in the after storage tanks which will lower the chemical oxygen demand of the digestate whilst re-introducing hydrogen into the primary digestion tanks which will assist in maintaining an environment conducive to anaerobic degradation.

6 Documentation and fees

6.1 This application constitutes an Installation Environmental Permit as per table 1.16 of the charging guide table reference 1.16.2.1.

Table 6.1 – Base Application Fee Table

EPR Charging Scheme Ref	EPR Charging Scheme Ref & Description	Type of application (Ref)	Fee
1.16.2.1	Section 5.4 (a)(i) and (b)(i) – non-hazardous waste installation – biological treatment	Installation Permit	**£13,984**
		TOTAL	**£13,984**

Table 6.2 – Additional Application Fees Table - Charges for plans and assessments

General	Consideration	Document & Ref	Fee
Environmental Management System	Required due to permitted activities	058-003-A	
Fire Prevention Plan	As Above	058-003-B	**£1,241**
Non-Technical Summary	As Above	058-003-C	
Environmental Risk Assessment	As Above	058-003-D	
Site Condition Report	As Above	058-003-E	
Noise and Vibration Management Plan	As Above	058-009-F	**£1,246**
Odour Management Plan	As Above	058-003-I	**£1,246**
BAT Assessment	As above	058-003-J	
Accident Management Plan	As above	058-003-K	
H1 Risk Assessment – Sewer Emissions	As above	058-003-M	
Emissions Modelling Assessment	As above	058-003-N	
Permit Application Supporting Information	As above	058-003-O	
		TOTAL	**£3,733**

6.2 Based on the above, the total fee payable to the Environment Agency on submission will be **£17,717**

6.3 Table 4.3 summarises which parts of the application forms request the above documentation which would normally be completed in Application Form Part F1; Section 6.

Table 6.3 – Application Form Reference Table

Application Form	Question Ref	Document Ref
Part B2	3B	058 003-G
Part B2	3D	058 003-A
Part B2	5A	058-003-01, 058-003-02, 058-003-03 - also found in Appendices of main documentation
Part B2	5B	058 003-E
Part B2	5C	058 003-C
Part B2	6	058 003-D
Part B3	1	058 003-C
Part B3	2 (Table 2)	058 003-03 & 058 003-O
Part B3	3 (Table 3)	058 003-O
Part B3	3b (Table 4)	058 003-D & 058 003-I & 058 009-F
Part B3	3c (Table 5)	058 003-O
Part B3	4a & 4b	058 003-O
Part B3	6a, 6b, 6c, 6d & 6e	058 003-O
Part B4	1	058 003-C
Part B4	1 (Table 1a)	058 003-C & 058 003-O
Part B4	2 (Table 2)	058 003-03 & 058 003-O
Part B4	3a (Table 3a)	058 003-O
Part B4	3b (Table 3b)	058 003-D & 058 003-I & 058 009-F
Part B4	4a & 4b	058 003-O
Part F1	6	058 003-C