Jacobs

Bioresources Permitting

Mansfield STW Permit Resubmission Application

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Severn Trent Water Ltd

EPR/GP3704PP/V002

Bioresources Permitting

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Contents

1. Introduction

This application relates to a substantial variation environmental permit application for a bespoke installation bioresources treatment permit for the Mansfield Sewage Treatment Works, operated by Severn Trent Water Ltd from the existing MCPD permit at the site.

The site currently also holds a T21 waste exemption which allows for the recovery of waste at a waste water treatment works which will be superseded by this permit application.

This application comprises an installation for the biological treatment of waste under the Industrial Emissions Directive, as implemented through the Environmental Permitting Regulations (2016) (as amended). It relates to the non-urban waste water treatment directive (UWWTD) treatment of indigenous UWWTD derived sludge and imported UWWTD sludge from other waste water treatment works. These operations are currently operated at the Mansfield Sewage Treatment Works site, under the UWWTD.

The listed activity starts from the point of the separation of the sludge from the main UWWTD treatment stream, through to the storage of sludge cake prior to its recovery to land offsite. The additional aspects of the permit include the biogas handling and treatment system as a directly associated activity, including a biogas fuelled gas engine, covered by an existing Medium Combustion Plant Directive environmental permit.

There are allowed imports to the head of works / inlet within the permit, relating to sewage related and water company derived wastes, as well as additional sewage related materials, imported under the Controlled Waste Regulations 2012 (as amended). Imported sewage sludges are also brought to site by tanker and introduced directly to the sludge digestion process.

A number of other activities are undertaken at the site, outside of the scope of this permit, relating to the treatment of sewage derived materials through aerobic processes. These activities are covered by the UWWTD.

1.1 Non-Technical Summary

This application is for a substantial variation to an installation permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended), following a change of interpretation of the Urban Waste Water Treatment Directive by the Environment Agency.

Mansfield sewage treatment works is located north-east of Mansfield town centre. The site is bordered to the west by an industrial estate with a secondary school in close proximity. To the north is a dual carriageway and housing with housing to the south. The eastern boundary is the River Maun and a park which is designated a local wildlife site, with housing beyond.

The site undertakes an allowed import activity under the Controlled Waste Regulations 2012, which comprises an offloading coupling for tankers and cess vehicles to discharge through, located at the works inlet.

This application covers the biological treatment of sludge by anaerobic digestion, with a capacity above the relevant thresholds. The biological treatment of sludge is for treatment of indigenous sewage sludges from the onsite aerobic treatment process as well as sludges imported from other works to this installation. The indigenous sewage sludges are generated from the aerobic treatment of waste waters from the sewer network arriving into site at the works inlet. Indigenous sludge is separated from the main aerobic treatment flow and mixed with imported sludges and thickened prior to transfer to the pre-digestion storage tanks and then the primary digesters.

There are two primary anaerobic digesters located at the site. Both digesters are above ground tanks and manufactured of concrete with steel roofs and operate on a continuous process basis, that is fresh sludge is added to the process as digested sludge is removed from the primary digesters. Removed sludge is transferred to one of two post-digestion buffer tanks, prior to being mixed with a polymer coagulant and dewatered using

two centrifuges. Dewatered sludge cake is stored on site in skips on a cake pad, prior to off-site transfer at a different Severn Trent sludge treatment centre for pathogen kill and storage prior to recovery to land.

There are a number of directly associated activities, including the operation of a biogas fuelled Combined Heat and Power (CHP) unit and two dual fuel boilers for the generation of electricity and heat at the site respectively. The boilers are classed as 'existing' combustion sources under the Medium Combustion Plant Directive. (MCPD), while the CHP is currently permitted under the MCPD.

Biogas is captured from the primary anaerobic digesters and stored within a telescopic roof biogas storage holder. The above ground biogas transfer pipeline is equipped with condensate pots that capture entrained moisture from the generated biogas and allow it to be drained into the site drainage system for treatment. The biogas storage vessel is fitted with pressure release valves as a safety precaution in the event of over pressurising the system.

The biogas is taken from the storage vessel for combustion in a CHP engine, generating electricity for use both within the site and for export to the grid, and heat to maintain primary digester temperature. This is currently permitted under the MCPD. Biogas can also be used in two dual fuelled auxiliary boilers which are classified as 'existing' units under the MCPD. In the event there is excess biogas, i.e. more than the CHP can utilise, or in the event that the CHP is unavailable, there is a ground mounted emergency flare. This is utilised under 10% of the year.

2. Technical Description

This application is for a substantial variation to a bespoke installation permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended), following a change of interpretation of the Urban Waste Water Treatment Directive by the Environment Agency. It relates to the permitting of indigenous and imported sewage sludge for treatment by anaerobic digestion for the Mansfield Sewage Treatment Works, operated by Severn Trent Water Ltd (Severn Trent).

Site Setting

Mansfield sewage treatment works is located north-east of Mansfield town centre. The site is bordered to the west by an industrial estate with a secondary school in close proximity. To the north is a dual carriageway and housing with housing to the south. The eastern boundary is the River Maun and a park which is designated a local wildlife site, with housing beyond.

The majority of the site sits within a Flood Zone 1. A small area of the wider works, primarily the eastern edge, is within Flood Zone 2 and has an annual probability of river flooding between 1:100 and 1:1,000. The site is within a groundwater source protection zone (SPZ) 3 for total catchment.

The nearest designated habitat site is the Maun Valley Park Local Nature Reserve (LNR), which is adjacent to the extent of the site's Eastern perimeter. There are two other LNR's and also eleven Local Wildlife Sites (LWS) within 2 km of the site. There is a single SAC, Birklands and Billhaugh, within 10km of the site. There are no SPA, MPA or RAMSAR sites within 10km of the site. There are no ancient woodlands or SSSI within 2km of the site. The site is not within an Air Quality Management Area (AQMA).

Application Basis

This application covers the biological treatment of indigenous and imported sewage sludge by anaerobic digestion, with a capacity above the relevant threshold. The site operates 24 hours per day with the site being unstaffed overnight. There are a number of directly associated activities, including the operation of a biogas fuelled CHP unit for the generation of electricity and heat at the site, which is already permitted under the Medium Combustion Plant Directive, operation of two dual fuelled auxiliary boilers and storage of biogas.

The Combined Heat and Power unit is currently permitted under the MCPD and as a specified generator. The boilers fall under the definition of an "existing" medium combustion plant (MCP) as defined by Schedule 25A of the Environmental Permitting Regulations (EPR) 2018, in that they are less than 20MW thermal and were commissioned prior to 20 December 2018.

The operations at the site do not fit within the requirements of the appropriate standard rules permit (2008 no 19, v5) due to the close proximity to designated habitat sites and the standard rules set not including operation of a biogas engine, which would otherwise require multiple permits at the site. A bespoke permit application is therefore required.

Waste Activities

The site undertakes a waste activity, which comprises an offloading coupling for tankers and cess vehicles to discharge through, located at the works inlet. Imports are limited to sewage type materials from a variety of trade and commercial customers, as well as inter works transfers. Some of these imports are excluded from the scope of the permitted activities by the Controlled Waste Regulations 2012. The import is directly into the works inlet, with no holding or blending tanks before the import.

Installation Activities

Indigenous sewage sludge is separated from the main UWWTD stream at the primary settlement tanks and pumped to 3 batch thickening tanks. The thickened sludge is then held in one of two enclosed pre-digestion

storage tanks prior to digestion where imported sludge from other waste water treatment works is blended with it. These tanks are equipped with a chemical scrubber odour control unit (OCU)(A8).

Sludge is imported from other sewage treatment works, by tanker. Tankers utilise universal couplings and site supplied transfer pipework to transfer sludge into the pre-digestion storage tanks. The offloading area is concrete, with kerbing and sleeping policemen to minimise the impact of any spillages during transfer operations. All imported loads are subject to Severn Trent's waste acceptance procedures.

Sludge is treated in one of two above ground anaerobic digesters which are located within the Western area of the STW and of concrete construction with steel roofs. These tanks are fitted with two pressure relief valves, which operate in an emergency only. The digesters operate on a continual basis with fresh sludge added to the process as digested sludge is removed. Sludge is held within the digester tanks for a period in line with the HACCP plan for the site.

Following primary digestion, the digested sludge is then fed by gravity to one of two open topped post-digestion buffer tanks, for dewatering in two centrifuges. The dewatered sludge cake is transported off site in skips for pathogen kill and storage at a different sludge treatment centre operated by Severn Trent on a daily basis. This area is a served by a chemical scrubber OCU (A9).

Biogas

Biogas from the primary digesters is captured and transferred to a telescopic roof gas holder on site, where it is stored pending combustion within a CHP engine on site, which runs on biogas only and provides both electricity to the site processes and heat to maintain the primary digester temperature. Electricity can also be exported to the National Grid when there is excess supply above the site needs. The site also has two dual fuelled auxiliary boilers and an auxiliary flare stack that can combust biogas when there is excess biogas that cannot be combusted by the CHP or when the CHP is offline for maintenance. Biogas is transferred from the gas holder via a biogas pipeline that is largely above ground and is fitted with condensate pots that capture entrained moisture from the generated biogas, and allow it to be drained into the site drainage system for aerobic treatment via the UWWTD treatment route.

The CHP engine is currently permitted under the MCPD. It has a thermal input of 1.3 MWth and is equipped with a vertical stack, unimpeded by cowls or flaps. In the event there is excess biogas, i.e. more than the CHP can utilise, or in the event that the CHP is unavailable, there are two dual fuelled auxiliary boilers, with a thermal input of 0.7 MWth each and one ground mounted emergency flare. The flare is utilised under 10% of the year. H_2S and siloxane levels are monitored within the biogas and treated if required by their concentrations. No routine dosing for H_2S with ferrous sulphate is undertaken within the permitted processes on site.

An air dispersion model using ADMS for the emissions from the CHP has previously been submitted. An explanation of the impact of the boilers on this data is included as Appendix C.

Process Monitoring

Anaerobic digester operations are monitored automatically from the control centre at the site and outside of normal operational hours, from the regional control centre. Checks include digester health, temperature and operation, including for the presence of foaming, which is treated with anti-foam as appropriate. All tanks are equipped with appropriate high-level alarms and automatic cut off valves to minimise the risk of overtopping. Site operations are covered by Severn Trent's ISO14001 accreditation for all operations, and technical competence is provided by the organisation's CMS and training program.

There is no cake pad at the site. Dewatered sludge is deposited into skips for transport off site to a different Severn Trent Water sludge treatment centre for pathogen kill and storage prior to recovery by spreading to land.

Site drainage from operational areas is captured within the site-wide drainage system and returned to the head of the works for treatment within the UWWTD treatment route. This return occurs after the storm offtake

location, so return liquors are always sent for treatment within the UWWTD flow. Site drainage plans are included within Appendix A.

BAT Assessment

A full assessment of the relevant sections of the Waste Treatment BRef are supplied as Appendix D.

Tank Type	Number	Volume (m^3)	Construction
Thickening Tanks	3	120	Steel
Pre Digestion Storage Tanks	2	267	Steel
Primary Digesters	2	1,975	Concrete
Post Digestion Storage Tanks	2	300	Steel

Containment

The site infrastructure is not currently fully compliant with the requirements of BAT, specifically with regards to containment.

A spill risk assessment and proposed containment solution, in accordance with CIRIA 736 is supplied as Appendix E.

The outline containment solution does not utilised flood gates within its design.

Open Topped Tanks

There are a number of open top tanks within the permit boundary at Mansfield, including the post digestion buffer tanks. It is acknowledged that there may be emissions of biomethane and/or odour from some of these tanks, and Severn Trent is preparing a monitoring exercise to determine the nature of any emissions and the quantity. Based on these outputs, the requirement for covering the tanks will be assessed, in accordance with the design of the existing tanks and HSE requirements around ATEX and DSEAR, in accordance with the applicability notes for BAT 14d.

As part of any tank cover design, the initial monitoring data will be necessary to determine if the correct routing of any gas from the tank headspace would be to the biogas utilisation system or to a new OCU. The quantification of tank emissions is needed to determine if the gas treatment assets also require upgrading, e.g. existing engine utilisation levels. If an OCU is the required for the gases, the quantification and nature of the emissions will be required in order to ensure that the unit is sized correctly, with the right media to deal with the substances present.

Due to the variability of air pressure on the potential release rate of gas from the tank contents, it is proposed that the monitoring exercise will involve 4 rounds of sampling over a 6 month period, to reflect levels at different ambient air temperatures and atmospheric pressures.

All proposed coverings will be subject to a cost benefit analysis, based upon the Environment Agency tool.

Liquor Returns Monitoring

There are no direct emissions to water from the sludge treatment facility. The only indirect emission is of the sludge liquors and surface waters, which are returned to the wastewater treatment works for aerobic treatment under Urban Wastewater regulations. The liquors returned from the sludge treatment facility have originated from wastewater treatment works that are also under the control of Severn Trent Water.

Severn Trent Water have always undertaken periodical sampling of ammonia on the centrate returns with regard to loading impacting the operation of the treatment works. More recently, they have also undertaken shadow sampling twice monthly for Ammonia, Soluble BOD, Total BOD, Orthophosphates and Suspended Solids in return liquors to the inlet, using the sample points noted in the table. Direct regular sampling of these returns is a fairly recent addition to our processes so our understanding of the variance in these returns is developing. COD, BOD, Total Nitrogen, TOC, Ammoniacal Nitrogen, total Phosphorous, suspended solids and pH are directly available at our UKAS accredited contract laboratory and we will begin sampling for these determinands. Not all processes have flow meters on the return lines, assumptions will be made from the throughput of the asset. Temperature would be a field-based measurement, currently this is not measured. STW will aim to sample for PFOS and PFOA on a six-monthly basis to build up a data set, but due to the two weeks analysis turn around, these are not of use to the live operational process.

The data obtained from the return sampling will be used to optimise the process and STW will carry out root cause investigations with the process support teams to understand what changed on site and ensure that we can reduce the risk to the inlet. If any abnormalities are identified in the sample data following root cause investigations, the Process Team will collaborate with wider site based teams and the Catchment team to ascertain the root cause.

As part of the new IED permit and in line with BAT 3, we commit to carrying out further chemical analysis of the waste water, testing for all pollutants expected to be present in the discharge. We are currently in discussion with UKAS accredited laboratories to see what analysis is possible on our leachate returns, and what 'minimum reporting value' is appropriate. This review will be undertaken in line with EA guidance, for example 'Surface Water Pollution Risk Assessment for your environmental permit', and 'Monitoring Discharges to Water'. The sampling will be undertaken by our suitably trained internal teams that already undertake compliance sampling for EA discharge permits to MCERTS standards. Analysis will be contracted to UKAS accredited laboratories.

The site has an odour management plan which is supplied as Appendix G.

There is no requirement for a fire prevention plan at the site, due to the nature of the wastes treated and the processes utilised, in accordance with Environment Agency guidance.

2.1 Regulatory listing

The installation is permitted as a Schedule 1 listed activity under the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

The relevant listing under Schedule 1 is:

Section 5.4 Disposal, recovery or a mix of disposal and recovery of non-hazardous waste

- *Part A(1) (b); 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 one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC—*

(i) biological treatment;

In addition to the listed activity at the site, there is a directly associated activity of a biogas combustion plant (CHP) which is also a specified generator, and auxiliary boilers. The CHP is subject to environmental permit EPR/GP3704PP/A0001, under the Medium Combustion Plant Directive under Schedule 25A and B of the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

There is also a waste management activity for the import of wastes to the works inlet. These import activities are the import of liquids and thin sludges for aerobic biological treatment, primarily of sewage related waste streams, including inter works transfers which are within the scope of the exclusion from the Controlled Waste Regulations 2012.

The site includes the following Directly Associated Activities (DAA):

- Import of sewage sludge to the digesters;
- Blending of imported wastes prior to treatment;
- Storage of digestate prior to onsite dewatering;
- Dewatering of digested sewage sludge;
- Transfer of centrate back to the head of the sewage treatment works;
- Storage of biogas;
- Combustion of biogas in an MCPD and SG compliant biogas CHP unit and auxiliary boilers;
- Emergency flare; and
- Storage of raw materials.

3. Application Form Questions:

3.1 Form C2

1 About the permit

1a Discussions before your application

A pre-application conservation screening report was provided on the 22nd July 2021. 1b **What is the permit number that this application relates to?**

EPR/GP3704PP/V002

1c 2a What is the site name, address, postcode and national grid reference?

Severn Trent Water Limited,

Mansfield Sewage Treatment Works,

Old Mill Lane,

Mansfield,

Nottinghamshire,

United Kingdom

NG18 2DA

NGR SK 54726 62270

2b Changes or additions to existing activities

Table C2-2b Changes or additions to existing activities

Installation name	Schedule 1 references	Description of the installation activity	Proposed changes document reference
Mansfield STW Bioresources	S5.4A1(b)(i) Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 100 tonnes per day involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC— (i) biological treatment by anaerobic digestion	From receipt of permitted waste through to digestion, dewatering and recovery of by-products (digestate) offsite.	This application

2c Consolidating (combining) or updating existing permits

Not applicable.

2d Treating batteries

Are you proposing to treat batteries?

No, this application is not for the treatment of batteries

2e Ship recycling

2e1 Is your activity covered by the Ship Recycling Regulations 2015?

No, this application is not covered by the Ship Recycling Regulations 2015

2e2 Is this a renewal of an existing authorisation covered by the Ship Recycling Regulations 2015?

No

2f Low impact installations (installation sonly)

2f1 Will any changes mean that any of the regulated facilities will become low impact installations?

No.

3 Your ability as an operator

3a Relevant offences

3a1 Have you, or any other relevant person, been convicted of any relevant offence?

Total payout	Type	Date	Location	Offender	Description of offence
£870,000	Prosecution	Jun-20	Shropshire, England	Severn Trent Water Ltd	Causing an unpermitted discharge, contrary to Regulation 38(1)(a) and regulation 12(1)(b) of the Environmental Permitting (England & Wales) Regulations 2010 and failing to comply with permit conditions, contrary to regulation 38(2).

3b Technical ability

Severn Trent Water utilises a competence management system to demonstrate technical competence at the site.

Please see the appended CMS certificate for the organisation, which has a scope including waste storage and treatment. At present Mansfield is not in scope, however, the organisation is in contract with LQRA to bring those sites outside of the current scope into CMS within the required period (within 12 months of permit issue) The certification visit is booked for May 2024.

The EU Skills coordinator has confirmed to STW there is no need to identify a specified person as TCM if the organisation is under the EU Skills scheme. The following is directly from the gov.uk website:

EU Skills scheme: The EU Skills scheme considers the competence of your business as a whole. To join this scheme you need to have a competence management system in place and this must be certified by one of the scheme's approval bodies.

3c Finances

Installations, waste operations and mining waste operations only.

Do you or any relevant person or a company in which you were a relevant person have current or past bankruptcy or insolvency proceedings against you?

There are no current or past bankruptcy or insolvency proceedings against the applicant.

3d Management systems

Confirm that you have read the guidance and that your management system will meet our requirements.

Yes, we can confirm that this is the case.

Does your management system meet the conditions set out in our guidance?

Yes. The Company holds BS EN ISO 14001:2015.

Please see Appendix B for EMS and CMS certificates.

Scope

Severn Trent Water was awarded certification to BS EN ISO14001:2015 for its Environmental Management System in August 2018. The certified EMS scope covers "Management and delivery of wastewater treatment processes. Transfer and storage of highway waste on depots. CHP biogas plant activities. Mothballed landfill monitoring activities, Head office functions at Severn Trent Centre."

Environmental Policy

Implementation of the Severn Trent Water's Environmental Policy is approved by the Severn Trent Executive Committee of the Severn Trent Plc Board and is the responsibility of all employees, with the Chief Executive being accountable for its implementation. The policy covers all Severn Trent activities, including this installation, and applies to all individuals who are employed by, or carry out work on behalf of, any Severn Trent group company including contractors, temporary staff and agency workers. The Management Systems Team (EMS specialists) is responsible for the implementation of the EMS, the site operations teams will be responsible for maintaining ongoing compliance and managing the sites.

https://www.severntrent.com/about-us/governance/our-policies/

Management and Responsibilities

The Management Systems Team (EMS specialists) has overall responsibility for the management and upkeep of the EMS. Compliance with specific elements of environmental legislation is managed by the relevant Business Areas across the Company. The Management Systems Team (EMS specialists) maintain a Legal Register and, in consultation with Operations Teams, their permit compliance advisors and other specialists, assess environmental risks for in-scope areas using a significance scoring method under normal, abnormal and emergency conditions. Significant environmental aspects and impacts take into account legal and other requirements, cost to the business, scale of impact and interested parties.

Management Systems Team (EMS specialists) are responsible for setting internal environmental standards with Standard owners which are then implemented by the relevant business areas. The Standards and other relevant information are communicated through a number of routes. Incident and corrective action routes exist to promote continual improvement.

Local operating procedures are the responsibility of the operational teams that operate the sewage works.

The defined roles and responsibilities are allocated to relevant personnel, depending on their job description, qualifications, knowledge, experience and training. Training and competency are based on specific roles.

Operational Control

Procedures are in place to identify and control environmental issues arising from Severn Trent Water activities. Each department is required to achieve operational control of its activities and, using a central database, identify and record any departmental environmental issues.

Routine sewage treatment operations and activities are recorded within the corporate management database, SAP. These include routine inspections, monitoring and maintenance tasks.

Non-routine activities, such as major overhauls/refurbishments, which involve the use of sub-contractors are assessed for health, safety and environmental risks and method statements are produced to address these, as part of the Managing Contractors process. Contractors who are required to carry out major services are closely managed by the team to ensure that compliance with Severn Trent Water's H&S and environmental policies is achieved. No contractors may work on site without having undergone a full site induction.

Processes on site operate continuously, 24-hours per day, 7-days per week, apart from maintenance periods. The plant is designed to operate unattended with process parameters being monitored continuously. Operating logs are stored electronically.

Maintenance and Monitoring

Management will have the ultimate responsibility for the effective maintenance of plant throughout the company. The facility has named staff that are responsible for day-to-day maintenance operations and contractors are also used as required. The following basic inspections and maintenance activities are carried out on site:

- Daily operation of plant (24/7) involves visual inspection of operational assets;
- Daily inspection of temporary pipe work installed;
- Weekly visual inspections of the bulk oil storage tanks and the oil pipework (visual check on above ground pipework);
- Monthly inspection of all bunds (oil, transformer, temporary, etc.) and condition of containerised engines;
- Routine maintenance programme for plant; and
- Routine lubrication programme.

Personnel responsible for the inspection, testing and maintenance of pollution prevention infrastructure are trained to an appropriate level to ensure compliance with the Infrastructure Monitoring Programme.

All regular maintenance of all plant and equipment will be completed on the time scale specified by the equipment manufacturer including routine. A full engine overhaul is likely to be scheduled every 20,000 operating hours. This high-level preventative maintenance is designed to avoid unscheduled down time, maximising the plant availability and its ability to control emissions and maintain an efficient level of operation between overhaul services. Record sheets will be completed that would highlight any issues that may require operator intervention outside the routine maintenance programme.

Environmental Improvement

Severn Trent Water is committed to environmental improvements and has established environmental targets and plans relating to materials and waste management, transport, climate change mitigation and adaptation (energy efficiency and renewable energy generation), water resources, biodiversity, river water quality, and drainage asset performance.

The EMS is subject to a Senior Management Review twice a year to consider environmental performance, objectives and targets and continual improvement.

Competence, Training and Training Records

Severn Trent Water aims to ensure that all employees are in possession of the knowledge, skills and experience necessary to perform their role in accordance with the company's operating procedures and in full compliance with the law. Training needs are identified by the employee's immediate supervisor or line manager.

The EMS delivers a structured environmental awareness programme and targeted awareness training, where a need is identified. Managers and the CMS (Competence Management System) Manager review the competence of those working for the company where the tasks have the potential to cause a significant negative environmental impact, or impact on the operation of permitted activities within the EMS scope. The EMS Team, Permit Compliance Technicians and relevant Departments are responsible for rolling out the Basic Environmental Awareness Modules and job specific training.

For each internal training course held a Training Record is issued through the employees' role specific records on SAP.

Induction training is carried out by the responsible line manager and consists of an introduction to the Company's Environmental Health and Safety Policy and description of emergency response and spill prevention procedures.

Staff receive specific training in the plant's operation and the environmental impact of the process as well as health and safety. The operators will have a detailed understanding of the operational procedures for the site for both normal and abnormal operation. As part of the training, operators will receive specific instructions relating to those aspects of plant operation that have the potential for a negative impact on the environment. This training will be provided by the equipment manufacturers or in-house staff as appropriate. All training is overseen by a dedicated in-house Learning and Development team, through "The Academy" process.

Severn Trent Water is able to demonstrate that permitted activities are managed by technically competent staff with its Competence Management System (CMS) that is independently certified to meet the requirements of an Industry Standard. All appointed Technically Competent Persons (TCPs) undergo EMS awareness training and CMS training. TCPs are required to re-take training every 2 years. A list of technically competent persons is stored within the CMS documentation on SharePoint.

Managing Contractors

There are several procedures to ensure contractors have the required skills and environmental competencies to carry out works at the site.

Initially, contractors are assessed by the procurement department for inclusion on the approved supplier list, which includes health and safety and environmental criteria for example, waste documentation such as waste carrier's licence/training certificates. Even when the contractors are on the approved supplier list, they are still further assessed for each specific contracted activity.

The contactor is required to submit a method statement prior to any commencement of work, identifying how work is to be undertaken and the associated risks. The method statement must be approved by the Site Manager or a TCP who is suitably qualified, who will also identify any site hazards and issue an Authorisation to Work/Enter the site, following a site induction. When on-site, the contractor must carry this Authorisation to Work at all times.

Incidents, Non-Compliances and Complaints

Severn Trent Water has procedures for incidents, non-compliances and environmental complaints.

Incidents are managed through site specific procedures which ensure that all incidents are logged and that necessary preventative and/or corrective actions are taken.

Complaints are managed by Customer Services, where all complaints are logged on the Complaints Records Online Storage System (CROSS). The Regional Managers are responsible for ensuring that action is taken and for liaising with the relevant regulatory bodies (where appropriate). They ensure that any complaint is investigated and, if found to be justified, that work is undertaken to resolve the issue. They also provide an appropriate

response to the complainant in a timely manner detailing the reason behind the issue and the actions taken to resolve the matter.

Information regarding complaints is recorded to allow determination of an appropriate response (corrective action) and to determine what measures need to be taken in the future to prevent its reoccurrence (preventive action). These records will be maintained as part of the management system for a minimum of four years.

Communication

There are regular meetings held on site to discuss all aspects of the treatment works and performance against targets. These meetings include the operation and performance of the installation. Other communication methods to promote environmental management issues and continual improvement include: 'Lessons Learnt' bulletins, OSC portal forums and compliance audits.

Auditing

The controls for addressing environmental aspects and impacts are checked through the EMS audit programme which is managed by the EMS Auditor. Findings are reported to Site Managers and their Leadership Team. All permitted sites are internally audited by the permitting team every three years as a minimum. These inspections support the EMS audit programme and are audited by the EMS Team on a sample basis. The EMS also checks that other audit programmes exist for our wider environmental obligations, for example, MCerts and Operator Self-Monitoring compliance assessments.

4 Consultation

Could the waste operation or installation involve releasing any substance into any of the following?

4a A sewer managed by a sewerage undertaker?

No – site drainage is managed within the wider sewage works, which is entirely within the boundary of this permit, operated by the applicant.

4b A harbour managed by a harbour authority?

No

4c Directly into relevant territorial waters or coastal waters within the sea fisheries district of a local fisheries committee?

No

4d Is the installation on a site for which:

4d1 - a nuclear site licence is needed under section 1 of the Nuclear Installations Act 1965?

No.

4d2 - a policy document for preventing major accidents is needed under regulation 5 of the Control of Major Accident Hazards Regulations 2015, or a safety report is needed under regulation 7 of those Regulations?

No.

5 Supporting information

5a Provide a plan or plans for the site

Please see Appendix A for the following plans:

Figure 1 – site location plan

Figure 2 – site layout plan

Figure 3 – site surfacing plan

Figure 4 – site drainage plan

Figure 5 – process flow diagram

5b Do any of the variations you plan to make need extra land to be included in the permit?

Yes. The existing permit covers the emission point for the CHP engine only. A H5 assessment is presented as Appendix F.

5c Provide a non- technical summary of your application

Please see Section 1.1 in this document.

5d Are you applying for an activity that includes the storage of combustible wastes?

No – the site handles and treats wastes using processes that fall outside the scope of the FPP guidance. Note that the site primarily handles liquids or pumpable sludges which do not pose a fire risk.

5e Will your variation increase the risk of a fire occurring or increase the environmental risk if a fire occurs?

N / A

5f Adding an installation

If you are applying to add an installation, tick the box to confirm that you have sent in a baseline report and provide a reference.

Severn Trent Water have chosen not to provide a baseline report for the site. The site has operated as a sewage treatment works for a significant period of time and there are no proposals to close or relocate the site. Due to the site history and difficulties in obtaining representative samples from land below existing infrastructure, in accordance with current Environment Agency guidance, no baseline data is provided. The surrender risk this poses is acknowledged.

6 Environmental risk assessment

An environmental risk assessment of the site changes has been carried out in line with the requirements of the Horizontal Guidance Note H1 and Guidance given on gov.uk. This guidance specifies the following approach to carrying out an environmental risk assessment for a proposed activity:

- Identify potential risks that your activity may present to the environment;
- Screen out those that are insignificant and don't need detailed assessment;
- Assess potentially significant risks in more detail if needed;
- Choose the right control measures, if needed; and

- Report your assessment.

Site Name	Designation	Distance	Direction
Birklands & Bilhaugh	SAC	7,800m	North-East
Maun Valley Park	LNR	100m	East
Ravensdale	LNR	275m	East
Quarry Lane	LNR	1800m	South-West
Maun Woodland and Scrub	LWS	<2km	-
Berry Hill Quarry	LWS	<2km	-
Valeclose Plantation	LWS	<2km	-
Debdale Lane Grassland	LWS	<2km	-
Maun Scrub and Grassland Mansfield	LWS	<2km	-
Woodhouse Grassland	LWS	<2km	-
River Maun, Mansfield	LWS	<2km	-
Maun Woodlands	LWS	<2km	-
Ratcher Hill Cutting	LWS	<2km	-
Racecourse Recreation Ground	LWS	<2km	-
Sandhurst Avenue Quarry	LWS	<2km	-

Data taken from MAGIC.gov.uk website, accessed August 2023. For habitat sites, the relevant distance for consideration are: International designations (SAC, MPA, SPA and Ramsar - 10km); National designations (SSSI – 2km); Nature reserves and ancient woodlands (2km)

The site is adjacent to the Maun Valley park Local Nature Reserve (LNR) which is the opposite bank of the River Maun on the eastern edge of the site. Beyond the park is the Ravensdale LNR, with another LNR to the south west of the site. There are also 11 local wildlife sites within 2km of the installation. There are no ancient woodlands or sites of special scientific interest (SSSI) within 2km of the site. There are no SPA, MPA, or RAMSAR sites within 10 km of the site. There is a single SAC, Birklands and Bilhaugh 7.8km to the north east of the installation.

The majority of the sewage treatment works site sits within Flood Zone 1, with a lower than 1:1000 annual risk of flooding, although elements of the UWWTD area of the site, sit within flood zone 2, along the River Maun boundary. The area of Flood Zone 2 has an annual probability of river flooding between 1:100 and 1:1,000. The site is within SPZ3 for total catchment.

The site is not within an Air Quality Management Area and there are not any within 2km of the site.

Table C2-6 Screening Assessment

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
Amenity issues: Litter, vermin and pests	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, amenity and recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. The site is located to the north east of Mansfield town centre between an industrial park and open green spaces across the River Maun. The nearest residential dwellings are located approximately 200m east of the site. The nearest commercial premises, consisting of retail units and warehouse units, are 30m west of the site. Ecological receptors: There are 7 LWS and 3 LNR within 2km of the site, with a SAC 8km from the site. There are no SSSI or ancient woodlands within 2km of the site. There are no SPAs, MPAs or RAMSAR sites within 10km of site.	The wastes handled at the site are UWWTD derived material delivered by sewer. There is no source of litter within the materials handled at the site. In the unlikely event pests or vermin are observed on site a suitable contractor is called in as soon as practicable.	X
Dust	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Litter above. The impact of dust on human health will depend on the distance and wind direction.	The wastes handled at the site are UWWTD derived material delivered by sewer. The site will not be handling inherently dusty or powdery wastes. Sewage cake retains a high moisture content and is not dusty. Roads will be maintained to avoid the production of dust. Produce sewage cake has sufficient moisture content to ensure it does not give rise to dust.	X
Assessment of point source emissions to air Emissions deposited from air to land	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Amenity issues above.	The installation has a biogas fuelled CHP engine and boilers, for which previous ADMS modelling indicates that there is no significant offsite impact. The emergency flare is used only during periods when there is a larger volume of biogas than the CHP engine or boilers are able to manage or is offline. Fugitive emissions to air are assessed separately.	X

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
	The impact of emissions from air on human health will depend on the distance and wind direction.		
Assessment of point source and fugitive emissions to water	The River Maun is adjacent to the sites eastern boundary, although this is away from the permitted activities at the site. The permitted activities at the site are within Flood Zone 1, which means the risk from flooding is >1:1000 per annum chance of happening each year. The eastern edge of the site, adjacent to the river, are in Flood Zone 2, with an annual probability of flooding of between 1:100 and 1:1000. Surface water drainage within the site drains to the inlet of the adjacent sewage treatment works for full treatment prior to discharge.	The main product of the process is a dewatered sewage sludge cake which is removed from site for landspreading Other aqueous discharges generated by process are limited (comprising biogas condensate, dewatering liquor and surface water run off). These sources are discharged to the on-site drainage system where they are transferred to main sewage works inlet. Due to the nature and small quantity of these emissions no further assessment of point source emissions is deemed necessary.	X
Assessment of odour	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Amenity issues above. The impact of emissions from odour on human receptors will depend on the distance and wind direction.	The site has an odour management plan in place. This includes management systems, procedures and monitoring to control fugitive emissions of odour at the plant. Waste inputs to the site are of a similar nature to indigenous waste streams and as such there is no change in odour profile at the site. There is no history of odour complaints associated with the site.	X
Energy	Global atmosphere (direct and indirect emissions)	Biogas generated by the facility is utilised to generate electrical power for the site and exported to the grid; thus increasing renewable energy supplies. Waste heat from the CHP engine is utilised to control primary digester temperature when required and reduce demand on the auxiliary boilers.	X
Land and disposal of waste to other processes	Rivers and streams – see Assessment of point source and fugitive emissions to water above. Drainage systems/sewers.	All waste streams disposed of off-site will continue to be to appropriately permitted facilities.	X

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
	The site is within SPZ3 for total catchment. Aquifers are classified as unproductive (superficial deposits) and principal for bedrock.		
Noise and vibration	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, amenity and recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. The site is located to the north east of Mansfield town centre between an industrial park and open green spaces across the River Maun. The nearest residential dwellings are located approximately 200m east of the site. The nearest commercial premises, consisting of retail units and warehouse units, are 30m west of the site. Ecological receptors: There are 7 LWS and 3 LNR within 2km of the site, with a SAC 8km from the site. There are no SSSI or ancient woodlands within 2km of the site. There are no SPAs, MPAs or RAMSAR sites within 10km of site.	Site design has been chosen to minimise the impact of noise on offsite receptors through building orientation, finishes and location of openings. Noise from plant and equipment will be minimised through purchasing decisions and a robust preventative maintenance programme There are no sources of vibration within the facility.	X
Bioaerosols	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, amenity and recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. The site is located to the north east of Mansfield town centre between an industrial park and open green spaces across the River Maun. The nearest residential dwellings are located approximately 200m east of the site. The nearest commercial premises, consisting of retail units and warehouse units, are 30m west of the site.	There is no operational cake pad at the works. Dewatered sludge is deposited directly in skips which are removed from site to another Severn Trent Water sludge treatment centre for pathogen kill and storage purposes, prior to recovery to land.	X
Other issues (including visual impact)	Not Applicable	There are no protected species or other site-specific environmental risks identified	X

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
Climate Change	Risks of increased temperature impacts resulting in digesters heating beyond optimal operating temperature and increased odour from sewage process. For human health and ecological receptors, see notes for Amenity issues above.	Digesters may require reduced heat input to digester via heat exchange system and digesters are insulated against worse impacts. Warmer temperatures may require less boiler input/use as a result of less heat demand, or increased heat dumping via air cooled radiator. If less biogas is used, the site may require a new gas engine that is appropriately sized to utilise additional biogas. However, the CHP engines will need to be replaced prior to 2050 when they reach the end of their operational lifespans.	X
	Risks of increased storm events that causes surface water runoff exceeds capacity of site drainage system, or additional dewatering operations due to rainwater ingress, or caused bunds to infill. Increased precipitation may increase flooding on agricultural land, decreasing ability to spread digested sludge cake to land. For water environment receptors, see notes for Assessment of point source and fugitive emissions to water above	The STW design may require expansion or additional storm capacity; however, this would apply to UWWTD operations at the site rather than permitted activities. May need to increase bund or containment volume for sewage treatment works or individual assets. Land spreading activities could be prevented during very wet, winter months. Although the site has a small cake pad which would allow digested sludge cake to be stored prior to application, normal operational practice to move digested sludge cake to other sites would be continued.	X

3.2 Form C3

1 What activities are you applying to vary?

Table C3-1a Types of activities

Schedule 1 listed activities						
Installation name	**Schedule 1 references**	**Description of the Activity**	**Activity capacity**	**Annex I (D codes) and Annex II (R codes) and descriptions**	**Hazardous waste treatment capacity (if this applies)**	**Non-hazardous waste treatment capacity (if this applies)**
Mansfield STW Bioresources	S5.4A1(b)(i) Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 100 tonnes per day involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC— (i) biological treatment by anaerobic digestion	From receipt of permitted waste through to digestion, dewatering and recovery of by-products (digestate) offsite.	350m^3 per day (input) 2,450m^3 per week (input)	R3 Recycling / reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) R13 Storage of waste pending any of the operations numbered R1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced) D10 Incineration on land D 15 Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced)	None	350m^3 per day 350 wet tonnes per day

Name of DAA	**Description of the DAA**
AR2	Import of sewage sludge to the digesters;
AR3	Storage of digestate prior to onsite dewatering;

AR4	Dewatering of digested sewage sludge;
AR5	Transfer of waste waters and centrate back to the inlet of the sewage treatment works;
AR6	Storage of biogas;
AR7	Combustion of biogas in an MCPD and SG compliant biogas CHP unit and auxiliary boilers
AR8	Emergency flare;
AR9	Storage of raw materials.

Waste Operations

	Description of the waste operation	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity	Non-hazardous waste treatment capacity
AR10	Imports of wastes: to the works inlet for treatment through the UWWTD route	D13: Blending or mixing prior to submission to any of the operations numbered D1 to D12	n/a	Maximum waste throughput 25,000 wet tonnes per annum

Total storage capacity (tonnes)	5500 m^3 (tanks)
Annual throughput (tonnes each year)	118,929 wet tonnes (sludge)

Types of waste accepted

Table C3-1b Types of waste accepted

Imports to the works inlet excluded under Controlled Waste Regulations

Waste code	Waste code Description of the waste
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 08 05	Sludges from treatment of urban waste water
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
20 03 04	septic tank sludge

Imports to the digesters

Waste code	Waste code Description of the waste
19 08 05	Sludges from treatment of urban waste water
19 08 12	sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11
20 03 04	septic tank sludge

1c Recovery of hazardous waste on land

Are you applying for a waste recovery activity involving the permanent deposit of inorganic hazardous waste on land for construction or land reclamation?

No.

2 Point source emissions to air, water and land

Table C3-2(i) Emissions to Air

Emission point reference and location	Source	Parameter	Concentration	Units
A1 SK 54739 62229	CHP engine (note 1)	NOx	190	mg/m^3
A2 SK 54733 62235	Auxiliary Boiler 1 (fueled on biogas)(note 2)	NOx	No limit set	mg/m^3
		SO_2	No limit set	mg/m^3
	Auxiliary Boiler 1 (fueled on diesel)	NOx	No limit set	mg/m^3
A3 SK 54724 62259	Auxiliary Boiler 2 (fueled on biogas)(note 2)	NOx	No limit set	mg/m^3
		SO_2	No limit set	mg/m^3
	Auxiliary Boiler 2 (fueled on diesel)	NOx	No limit set	mg/m^3

Emission point reference and location	Source	Parameter	Concentration	Units
A4 SK 54693 62293	Emergency Flare (note 3)	NOx	150	mg/m^3
A5 SK 54723 62236	Digester tank pressure relief valve	No limit set	-	-
A6 SK 54716 62254	Digester tank pressure relief valve	No limit set	-	-
A7 SK 54714 62225	Gas holder pressure relief valve	No limit set	-	-
A8 SK 54752 62250	Chemical scrubber OCU for thickening tanks, pre-digestion storage tanks and decant chamber	No limit set	-	-
A9 SK 54713 62343	Chemical scrubber OCU for Centrifuge area	No limit set	-	-
A10 SK 54812 61930	Chemical scrubber OCU for sludge reception area	No limit set	-	-
Odour Control Units (OCUs)	OCU's outside of the permit boundary, located at the works inlet	No limit set	-	-

Note 1: These limits are based on normal operating conditions and load – temperature 0°C (273K); pressure: 101.3 kPa and oxygen: 15 per cent (dry gas).

Note 2: These limits are based on normal operating conditions and load – temperature 0°C (273K); pressure: 101.3 kPa and oxygen: 5 per cent (dry gas). The measurement uncertainty specified in LFTGN05 v2 2010 shall apply.

Note 3: Monitoring to be undertaken in the even the auxiliary flare has been operational for more than 10 per cent of a year (876 hours). Record of operating hours to be submitted annually to the Environment Agency.

Table C3-2(ii) Emissions to water (other than sewers)

Emission point reference and location	Source	Parameter	Concentration	Units
T1 SK 54729 62316	Surface water drainage from cake pad area; dewatering area and post-digestion buffer tanks	No limits set	-	-
T2 SK 54762 62219	Surface water drainage from around thickening tanks, pre-digestion tanks, primary digesters, gas storage, CHP engines and boiler house	No limits set	-	-

There are no permitted emissions to land from the activities covered by this permit.

3 Operating techniques

3a Technical standards

Table C3-3 Technical standards

Schedule 1 activity or DAA	Best available technique	Document reference
Anaerobic Digestion plant S5.4A1(b)(i)	Biological waste treatment: appropriate measures for permitted facilities	Updated 6th July 2023

3a1 Does your permit have references to any of your own documents or parts of documents submitted as part of a previous application for this sites?

Yes. The previously submitted ADMS modelling for the CHP engine at the site remains valid.

3b General requirements

Table C3- General requirements

Name of the installation: Mansfield STW Bioresources	Document references
If the technical guidance or your risk assessment shows that emissions of substances not controlled by emission limits are an important issue, send us your plan for managing them.	N/A – see Table C2-6 above
If the technical guidance or your risk assessment shows that odours are an important issue, send us your plan for managing them.	See Odour Management Plan Appendix F
If the technical guidance or your risk assessment shows that noise or vibration are important issues, send us your noise or vibration plan (or both).	N/A – see Table C2-6 above

3b - General requirements

Although screened out of the detailed Risk Assessment (Question B2 Q6), due to the nature of the process the installation has the potential to generate fugitive emissions to air and water, which are subject to a number of process controls.

Risk Matrix and Terminology for Accident for Risk Assessment

Likelihood ↓	Consequence		
	Low	Medium	High
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

Classification	Likelihood	Consequence	Risk
Low	Probability of an event is low and likely only to occur in the long-term (a yearly basis or less frequent).	Impact is low or a minor, short-term nuisance. Minor release to a non-sensitive receptor or pollution of water course. Non-permanent health effects to human health (preventable by appropriate PPE). Minor surface damage to buildings; structures; services; or the environment which can be repaired immediately.	A level of harm is possible although this may not be noticeable to a receptor and would be a short-term event without lasting effects. Level of harm can be reduced using industry best practice and appropriate measures and techniques.
Medium	It is probable that an event will occur periodically in the medium-term (twice yearly basis).	Impact is noticeable in the short to medium-term. Large release impacting on the receiving media killing flora and fauna and requires remediation. Nuisance causing non-permanent health effects to human health. Damage to buildings; structures; services; or the environment preventing short-term use and/or requiring repair.	A level of harm may arise to a receptor which is noticeable although not long-lasting and may require some remedial actions in order to prevent re-occurrences.
High	An event is very likely to occur in the short-term (monthly or weekly basis) and is almost inevitable over the long-term OR there is evidence at the receptor of harm or pollution.	Impact is significant, wide-ranging and long-lasting effect. Has a chronic or acute impact on human health. Very large release that has a major impact on flora and fauna which may be very difficult to remediate. Significant damage to buildings; structures; services; or the environment which prevents use long-term and may require complete replacement. May cause a long-term impact or contribute towards a global issue due to releases of greenhouse gases.	A level of harm is likely to arise to a receptor that is severe causing significant harm to human health or the environment without appropriate remedial and mitigation measures being implemented. Remedial works to infrastructure and processes is required in the long-term.

Although screened out of the detailed Risk Assessment (Question B2 Q6), due to the nature of the processes, the anaerobic digestion operations and digested sludge cake storage, along with biogas utilisation have the potential to generate fugitive emissions to air and water, which are subject to a number of process controls.

Table C3-3b(i) Fugitive emissions risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Emissions to air of NOx, SO_2, CO_2 and VOCs	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors	High	Low	Medium	Activities are managed and operated in accordance with the site management system (including inspection and maintenance of equipment and LDAR assessment and, engine management systems), point source emissions to air (CHP engines, boiler and emergency flare stack) have emission limits for NOx, CO_2, SO_2. Flare stack height approx. 5m, CHP stack approx. 5m and boiler flue approx. 6m.	Low
Gas transfer systems, gas storage tank, gas engines, flares or PRVs failure causing emissions of biogas	Abnormal	Emissions to air and dispersion leading to inhalation by local human and animal receptors. Odour impact. Global warming potential. Risk of fire and explosion	Low	Medium	Low	The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge. The gas system utilised is subject to regular preventative maintenance and an LDAR assessment to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						Personnel on site wear portable gas detectors in order to alert staff to presence of biogas. A waste gas burner (emergency flare) is utilised for the safe disposal of surplus gas in the event of plant breakdown, or a surplus of gas above the level that can be safely stored or utilised. Use of emergency flare is recorded. PRVs are in place on the gas holder to be operated in the event of failure of the emergency flare to prevent overpressurisation and catastrophic failure.	
Catastrophic loss of biogas emissions from gas transfer systems, gas storage tank, gas engines, flares or PRVs	Abnormal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global warming potential. Risk of significant fire and explosion	Low	High	Medium	The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge. The gas system utilised is subject to regular preventative maintenance to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected. A waste gas burner (emergency flare) is utilised for the safe disposal of surplus gas in the event of plant breakdown, or a surplus of gas above	Medium

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						the level that can be safely stored or utilised. Use of emergency flare is recorded. PRVs are in place on the gas holder to be operated in the event of failure of the emergency flare to prevent overpressurisation and catastrophic failure.	
Combustion of biogas within CHP engine and emergency flare. Combustion of biogas or diesel within boilers	Normal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Global warming potential	High	Low	Medium	Combustion plant is regularly maintained and appropriately sized to manage volumes of gas. Combustion plant operates within permitted ELVs subject to routine monitoring against permit compliance. CHP engine and emergency flare are both located away from the nearest residential properties which are 350m east from CHP engine, nearest commercial buildings approx. 40m west.	Low
Release of bioaerosols and dust	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors. Odour impact of bioaerosols. Nuisance impact of dust.	Low	Low	Low	There is no operational cake pad at the works. Dewatered sludge is deposited directly in skips which are removed from site to another Severn Trent water sludge treatment centre for pathogen kill and storage purposes, prior to recovery to land. The only potential source of bioaerosols at the facility would therefore be biofilter OCUs.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						Roads are made from concrete/asphalt and not prone to the generation of dust.	
Spillage of liquids, including chemicals and oils.	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality Emissions to ground and ground water.	Low	Medium	Low	The closest surface water body is the River Maun on the eastern boundary. Chemicals and oils all stored within suitably bunded tanks and IBCs with rainwater removed as required to maintain 110% capacities. Penstock valves available within chemical delivery areas to contain large spillages Handling and use of chemicals and oils is carried out by trained personnel. COSHH data sheets available. Spill kits available on site. There are no point source emissions to water with drainage system pumping back to works inlet.	Low
Spillage from storage and digestion tanks, overtopping of tanks, leakage from same tanks and from buried pipes	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality	Medium	Medium	Medium	The site lies within SPZ3 for total catchment. Provision of suitably structurally integral tanks constructed from pre-conditioned concrete, and, steel and glass reinforced plastic/insulation (where needed). All tanks are subject to asset inspection and proactive	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
		Emissions to ground and ground water.				maintenance programme including regular visual inspection for cracks or weeping. Visual checks during regular day-to-day operations and scheduled preventative maintenance of equipment, such as pumps, pipes, joins etc. Biogas condensate discharged back to the works inlet through site drainage system. Spill kits available on site. There are no point source emissions to water with drainage system pumping back to works inlet.	
Generation of solid waste resulting in litter	Normal	Releases of litter to the environment. Visual nuisance and local loss of amenity	Low	Low	Low	Site operations do not give rise to large amounts of solid wastes and litter that would be prone to dispersion by wind. Rags are stored within skips and retain high moisture content. Waste is stored securely for collection by appropriately licensed approved contractors. Litter picking activities are completed as required.	Low

Where the TGN or H1 assessment shows that odours are an important issue, send us your odour management plan.

Due to the nature of the process, the installation has the potential to generate odorous emissions resulting from the permitted activities. Odour management is a key operational objective, as summarised in the risk assessment table below. A copy of the site-specific odour management plan has been appended to this application as Appendix F.

Table C3-3b(ii) Odour risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
H_2S/biogas emissions from uncovered tanks	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	High	Low	Medium	Biogas will principally be generated in the two primary digestion tanks which are covered with fixed roofs. The nearest residential properties which are 350m east from CHP engine, nearest commercial buildings approx. 40m west. H_2S production is controlled through the digestion process which can be manually overridden if required.	Low
Loss of containment from biogas holder and biogas pipework	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Medium	Low	Biogas is principally stored within the telescopic roof gas holder which is suitably sized to manage biogas generation. The gas system utilised is subject to regular preventative maintenance to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						Personnel on site wear portable gas detectors in order to alert staff to presence of biogas. Physical protection measures in place for biogas holder, including physical protection, lightning protection and pipework is guarded. PRVs available to safely manage pressures within the biogas holder and prevent under or over pressurization.	
Activation of biogas pressure relief valve	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	PRVs are only activated in emergency situations to maintain safety within the biogas system and are re-seated/repaired promptly to minimize biogas emissions. PRVs subject to monitoring via SCADA and visual checks by site personnel. Biogas is principally stored within the telescopic roof gas holder which is suitably sized to manage biogas generation and act as buffer storage for biogas. Site has one CHP engine, two boilers and one flare which are used in order of preference to maximise recovery of energy. CHP engine and boilers are subject to regular maintenance to maintain maximum use of outlets, with flare maintained in good working order should it need to be used.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						The nearest residential properties which are 350m east from CHP engine, nearest commercial buildings approx. 40m west.	
H_2S/biogas emitted when biogas cannot be combusted in engine, boilers or flare	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	Biogas is principally stored within a telescopic roof gas holder which is suitably sized to manage biogas generation and act as buffer storage when biogas cannot be combusted. Site has one CHP engine, two boilers and one flare giving multiple outlets for biogas. The nearest residential properties which are 350m east from CHP engine, nearest commercial buildings approx. 40m west. CHP engine and boilers are subject to regular maintenance to maintain maximum use of outlets, with flare maintained in good working order should it need to be used.	Low
Storage of treated digested sludge cake	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	Digested sludge cake is stored at the site in skips which are retained on site for the minimum time practicable.	Low
Failure of odour control units	Abnormal	Emissions to air and dispersion leading to	Low	High	Medium	Odour control units are subject to regular preventative maintenance.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
		inhalation by local human receptors Loss of amenity from odour nuisance				Media is replaced inline with the manufacturer recommendations	
Storage of site generated wastes	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	Wastes generated on site are not inherently odorous and is stored securely for collection by appropriately licensed approved contractors.	Low

If the TGN or H1 assessment shows that noise or vibration are important issues, send us your noise or vibration management plan (or both)

The installation has the potential to generate noise as a result of the permitted activities. Potentially noisy activities are subject to a number of process controls and noise management is a key operational objective, as summarised in the risk assessment table below. Note there is no history of substantiated noise complaints relating to the site:

Table B3-3b(iii)Noise risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Operation of CHP engine	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	The CHP engine is acoustically baffled, self-contained and designed for external applications therefore noise emissions are already low.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						CHP engine is located away from the nearest residential properties which are 350m east from CHP engine, nearest commercial buildings approx. 40m west. Good maintenance of plant to ensure that excessive noise levels are not generated. Regular checks of noise mitigation measures fitted to items of plant. Such measures include silencers and baffles fitted to specific areas of plant. Where repair or replacement is required, the plant will, where possible, be taken out of service until repair or replacement of parts has been undertaken.	
Operation of fans on air cooled radiators	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	Air cooled radiators do not give rise to high levels of noise and are only used as required. They are located away from sensitive human receptors. The nearest residential properties which are 350m east from CHP engine, nearest commercial buildings approx. 40m west. Good maintenance of fans to ensure that excessive noise levels are not generated. Where repair or replacement is required, this will be completed promptly.	Low
Operation of site vehicles	Normal	Generation of noise with air transportation, causing loss	High	Medium	High	Vehicle movements across the site subject to speed limit and one-way system to reduce generation of noise.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
		of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.				Reversing obligations minimised by site layout.	
Operation of emergency flare	Abnormal	Generation of noise with air transportation, causing loss of amenity to local human receptors.	High	Low	Medium	Use of the emergency flares is minimized by prioritizing use of the CHP and boilers with use of the flare recorded. Emergency flare is located approx. 350m west of nearest residential properties, nearest commercial buildings approx. 40m west.	Low

Table B3-3b (iv) - Environmental Risk Assessment and Accident Management Plan

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Major fire and/or explosion causing the release of polluting materials to air, water or land.	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population Emissions to ground and ground water of digestate contaminating soil and/or	Low	High	Medium	Follow site Incident Response Plan and inform relevant authorities. Management systems requires DSEAR assessment which is adhered to by site operations. Designated ATEX zones on site and lightning protection system in place around biogas holder. Fire alarm systems installed and maintained.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality. Injury to staff, fire fighters or arsonists/vandals.				Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop gas glows, electric temperature sensor, pressure monitors, flame arrestors, etc. Warning signs clearly displayed and staff wear gas alarms to alert to the presence of biogas. All visitors subject to site inductions and accompanied. Permit-to-work system in place. Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively. Smoking only permitted in designated areas of site.	
Minor fire causing the release of polluting materials to air, water or land	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality.	Low	Medium	Low	Follow site Incident Response Plan and inform relevant authorities. Management systems requires DSEAR assessment which is adhered to by site operations. Designated ATEX zones on site and lightning protection system in place around biogas holder. Fire alarm systems installed and maintained. Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop gas glows, electric temperature sensor, pressure monitors, flame arrestors, etc.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	Injury to staff, fire fighters or arsonists/vandals.				Warning signs clearly displayed and staff wear gas alarms to alert to the presence of biogas. All visitors subject to site inductions and accompanied. Permit-to-work system in place. Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively. Smoking only permitted in designated areas of site.	
Failure to contain firefighting water	Emissions to ground and ground water of contaminated firefighting water entering soil and/or groundwater. Run-off from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality	Low	Medium	Low	Likelihood of firefighting water being generated is low as the risk of fire is low. Follow site Incident Response Plan and inform relevant authorities. Spill kits provided around the site can be used to direct run-off towards site drainage. Site drainage returns to works inlet providing containment and treatment process for fire water. Arrange for off-site tankering of firefighting water, if required.	Low
Accidental explosion of biogas	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population.	Low	High	Medium	Follow site Incident Response Plan and inform relevant authorities. Management systems requires DSEAR assessment which is adhered to by site operations.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	Injury to staff, fire fighters or arsonists/vandals. Pollution of water or land				Designated ATEX zones on site and lightning protection system in place around biogas holder. Fire alarm systems installed and maintained. Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop gas glows, electric temperature sensor, pressure monitors, flame arrestors, etc. Lightning protection system installed. Likelihood reduced by availability of multiple on site uses of biogas (CHP, boilers and emergency flare) and use of pressure release valves as a safety measure.	
Significant leak of biogas to atmosphere	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population. Global warming potential of greenhouse gases.	Low	High	Medium	Site assets are protected by physical means to prevent vehicle strike and exposed pipework is guarded. Regular proactive and preventative maintenance and regular visual checks. Pressure relief valves are present to avoid overpressurisation of biogas system.	Low
Leaks of emission to air, but principally NOx.	Emissions to air and dispersion leading to harm to protected nature conservation sites – including SSSIs, SAC and SPA.	Medium	Medium	Medium	The nearest designated protected habitat is a LWS adjacent to the site with a further two LWS and seven LNRs within 2 km of the site and a SAC 8km away.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	Harm to protected site through toxic contamination, nutrient enrichment, disturbance etc.				Emissions modelling shows that deposition and impacts on habitats sites are acceptable. Site operations will be subject to emission limits under current Regulations with infrastructure designed to minimise uncontrolled releases. Checks, monitoring and preventative maintenance will further minimise fugitive emissions.	
Spillage of raw materials during (e.g. diesel) during use, transfer and disposal operations.	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality	Low	Medium	Low	Raw materials are stored on made ground, within bunded containers or on bunds to contain spillages of 110% of the volume. Contents of bunds are regularly checked during environmental audits and after periods of heavy rainfall and emptied as required. In event of a spillage, follow site spillage response plan and inform relevant site personnel. COSHH data sheets available. Deliveries to site are made by approved suppliers. Use of raw materials is carried out by trained personnel or automatically controlled processes. Penstock valves available within chemical delivery areas to contain large spillages. In the event of a minor spillage, spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage if suitable.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					Site drainage returns to works inlet providing treatment process for suitable materials, or arrange off-site tankering of waste, if required.	
Spillage of sludges (e.g. raw sludge, digested sludge) during processing and transfer operations e.g. tank overtopping, pipework leaks	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality	Low	Low	Low	Processing and transfer operations of waste materials is largely an automatic process controlled by the Process Controllers and parameters set within the SCADA system. Storage and digestion tanks are fitted with sensors to monitor levels within a tank and can inhibit additional pumping if high alarms activate. Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively and minimise the risk of spillages. In event of a spillage, follow spillage response plan and inform relevant site personnel and authorities. Spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage. Site drainage returns to works inlet providing treatment process for sludge or arrange off-site tankering of waste to another site. Sludge is relatively viscous and not highly mobile.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Failure of sludge storage tanks / digester tanks	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality.	Low	High	Medium	Follow site Incident Response Plan and inform relevant authorities. Regular infrastructure inspections for tanks and pipework and planned preventive maintenance system in place. Regular visual inspections for tanks and pipework and reactive maintenance. In-line flow monitoring in key locations and tank level monitoring would identify losses and enable a quick response. Tanks are mostly found on made ground and connected to site drainage which returns to works inlet. Sludge is relatively viscous and not highly mobile limiting the distance it can spread in a short time period.	Medium
All on-site hazards: machinery	Direct physical contact with human population and /or livestock after gaining unauthorised access to the installation Bodily injury	Low	High	Medium	Direct physical contact is minimised by activity being carried out within enclosed digesters Site activities are managed and operated in accordance with a management system. Site physical security measures to prevent unauthorised access. Assets are protected by various physical means including fencing, kerbing and bollards to prevent vehicle strikes.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					Site has a one-way traffic management system to minimise the need to reverse. Use of banksmen as appropriate. Vehicles equipped with reversing alarms.	
Vandalism causing the release of polluting materials to air (smoke or fumes), water or land.	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality. Injury to staff, fire fighters or arsonists/vandals.	Low	High	Medium	Unauthorised access is unlikely to happen and minimised by physical site security measures and effective management systems. Site has access controlled barrier entry for all vehicular access. Fence runs the perimeter of the site. Additional security fences around some assets and other assets are kept within locked containers or buildings. Warning signs are displayed.	Low
Flooding from rivers, streams and groundwater	Emissions to surface water course and harm to aquatic flora and fauna. Infiltration to ground and groundwater. Harm to aquatic flora and fauna and chronic effect on water quality.	High	Low	Medium	The site generally sits within Flood Zone 1 with a greater than 1:1000 risk of flooding per annum, although the eastern side of the site closest to the river is in Flood Zone 2 (1:100 – 1:1000 annual risk of flooding).	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					General wider works designed to minimise risk of localised works flooding due to storm surges. Follow site Incident Response Plan and inform relevant authorities. Take appropriate corrective and preventative actions to minimise environmental impact	
Flooding due to drain blockages and/or excessive rainfall causing localised on-site surface water flooding	Emissions to surface water course and harm to aquatic flora and fauna. Infiltration to ground and groundwater. Harm to aquatic flora and fauna and chronic effect on water quality.	Medium	Low	Low	Site wide drainage system linked to main sewage works, which includes additional capacity in storm tanks within the works to manage additional flows. Follow site Incident Response Plan and inform relevant authorities. Take appropriate corrective and preventative actions to minimise environmental impact	Low
Loss of mains power leading to failure of pumps / control systems and possible leaks and escape of sludge.	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna.	Low	Medium	Low	Site CHP engine is able to supply electricity to the site using biogas supplies on site. Emergency generators provide back-up power / contingency plans to provide power to critical operations in the event of an electrical outage. Failsafe systems in place to ensure sludge remains in situ in the event of a loss of power and that systems are promptly returned into operation.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					Site wide drainage system linked to main sewage works in the event of a spillage.	

3c Types and amounts of raw materials

Table C3-5 Types and amounts of raw materials

Name of the installation	Mansfield Sewage Treatment Works				
Schedule 1 activity	**Description of raw material and composition**	**Maximum storage amount (tonnes or as stated)**	**Annual throughput (tonnes per annum or as stated)**	**Description of the use of the raw material including any main hazards (include safety data sheets**	**Alternatives**
Section 5.4A(1)(b)(i)	Anti foam	2 IBCs (1000 litres each)	Rarely used as this sight does not have an issue with foaming.	Added to primary digesters to reduce foaming, as required	Standard product used for this purpose within the industry
	Fuel oil/Diesel/LFO	18,000 litres	<10,000 litres	Back-up fuel for use within boilers and or back-up generators	No viable alternative. Used as a backup only.
	Lubricating oils	1,000 litres	<4,000 litres	Equipment lubricant	None available
	Glycol coolant	100 litres	<500 litres	CHP engine coolant	None available
	Dry chemical scrubber material	None	Replaced as required on return basis to manufacturer	Dry chemical pellets impregnated with stabilized chlorine dioxide in first stage. Second stage utilizes countervalient pelleters.	None as unit designed to use this media for chemical scrubbing
	Water treatment chemicals	Not stored on site	Replaced as required	Water treatment for the boilers	None available
	Biogas	1,500m^3	See Biogas 1.1	Primary fuel for the CHP	Best available practice.
	Polymer	6 tonnes	<100 tonnes	Digested sludge thickening	None available
	Lime	Not stored on site	<10 tonnes/year	Pathogen control for sludge where kill level has not been achieved	None available
	Ferric Sulphate (Powder)	30 tonnes	Replaced as required	Phosphate/Struvite control	None available

4 Monitoring

4a Describe the measures you use for monitoring emissions by referring to each emission point in Table 2 above.

The air emission points A1 – A3 to be monitored in accordance with the requirements of MCPD and Environment Agency guidance. A4 hours of operation will be recorded and only monitored if they exceed 10% of the year.

PRV Emission points A5 – A7, and the odour control units A8 – A10 are to be monitored in accordance with current EA guidance and the requirements of the sites Odour Management Plan.

Points T1 and T2 are not subject to routine monitoring, although monitoring will be undertaken at the sampling points identified.

4b Point source emissions to air only

4b1 Has the sampling location been designed to meet BS EN 15259 clause 6.2 and 6.3?

No

4b2 Are the sample ports large enough for monitoring equipment and positioned in accordance with section 6 and appendix A of BS EN 15259?

No

4b3 Is access adjacent to the ports large enough to provide sufficient working area, support and clearance for a sample team to work safely with their equipment throughout the duration of the test?

Yes

4b4 Are the sample location(s) at least 5 HD from the stack exit

No

4b5 Are the sample location(s) at least 2 HD upstream from any bend or obstruction?

No

4b6 Are the sample location(s) at least 5 HD downstream from any bend or obstruction?

No

4b7 Does the sample plane have a constant cross sectional area?

Yes

4b8 If horizontal, is the duct square or rectangular (unless it is less than or equal to 0.35 m in diameter)

No

4b9 If you have answered 'No' to any of the questions 4b1 to 4b8 above, provide an assessment to how the standards in BS EN 15259 will be met.

As an existing site with combustion assets, sampling locations and sampling ports may not meet all of the requirements for BS EN 15259, but monitoring has been carried out over a number of years in accordance with the permit requirements with the installed ports. Due to the nature of the ducting access, it is not possible to

conduct a full velocity profile, however, no particulate sampling is required for biogas fuelled units, and all gaseous species are considered to be mixed sufficiently for the purposes of monitoring. There is no requirement to undertake a homogeneity test as per BS EN 15259 and as such the location cannot be compared against that or the criteria in M1. The sampling location is as previously approved for use by the Environment Agency.

Due to the size of the CHP and boilers, a permanent sampling platform is not provided, however, a temporary sampling platform is utilised to provide sufficient space, in accordance with standard industry practice.

Air emission points A1-A3 will be subject to periodic monitoring in accordance with the requirements of the Medium Combustion Plant Directive (EU2015/2193).

5 Environmental impact assessment

5a Have your proposals been the subject of an environmental impact assessment under Council Directive 85/337/EEC of June 1985 [Environmental Impact Assessment] (EIA)?

No

6 Resource efficiency and climate change

6a Describe the basic measures for improving how energy efficient your activities are.

The installation is designed to treat thickened sewage sludge to enable its recycling to land as a fertiliser, and to capture and utilise biogas to generate green electricity.

The plant has been designed from first principles to be energy efficient. Gravity is used as far as practicable for the transfer of sludge and liquids within the installation in order to minimise energy requirements. Biogas is captured and used within the CHP engine in the first instance to generate both electricity for use within the wider site and for export to the electrical grid as appropriate. Waste heat from the CHP engine is utilised to ensure that the primary digesters operate within the optimum temperature range for the anaerobic digestion process to be undertaken. The digester vessels are insulated to retain this additional heating, and boilers which are fuelled by biogas, are utilised in particularly cold periods to supplement the digester heating. Flaring is minimised.

Lighting has been optimised for low energy use and all pumps and other mechanical and electrical plant subject to regular, routine, preventative maintenance to minimise losses.

6b Provide a breakdown of any changes to the energy your activities use up and create

The main site energy sources are electricity from the public supply and biogas generated by the anaerobic digester which is combusted in the CHP engine to generate electricity and heat on site.

6c Have you entered into, or will you enter into, or will you enter into, a climate change levy agreement

No, the activities are not eligible to take part in the CCL Scheme.

6d Explain and justify the raw and other materials, other substances and water that you will use

See Table C.3-5 in response to question 3c above.

6e Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste

The facility is a waste treatment plant, and the primary wastes produced through the processes on site are maintenance waste. Production of maintenance waste is minimised by ensuring that preventative maintenance is carried out based on a combination of manufacturers best practice and operational experience.

3.3 Form C4

1 What waste operations are you applying to vary?

Table C4-1a Waste operations which this application is to vary.

Waste operation	Description of the waste operation	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity (if this applies)	Non-hazardous waste treatment capacity (if this applies)
Acceptance of imported wastes at head of works	See Table C3.1a earlier			
	Total storage capacity			
	New total if varying to increase			
	Annual throughput (tonnes per year)			
	New total if varying to increase			

Types of waste accepted

Table C4-1b Types of waste accepted

See response to C3-1b

1c Are you applying for a waste recovery activity involving the permanent deposit of waste on land for construction or land reclamation (including landfill reclamation)?

No

2 Point source emissions to air, water and land

See Table C3-2(I) and Table C3-2(ii).

3 Operating techniques

3a Technical standards

Table C4-3a Technical standards

Schedule 1 activity or DAA	Best available technique	Document reference
Anaerobic Digestion plant S5.4A1(b)(i)	Biological waste treatment: appropriate measures for permitted facilities	Updated 6th July 2023

3b General requirements

Table C4-3b General requirements

Name of the waste operation:	Document references
If the technical guidance or your risk assessment shows that emissions of substances not controlled by emission limits are an important issue, send us your plan for managing them.	N/A – see Table C2-6 above
If the technical guidance or your risk assessment shows that odours are an important issue, send us your plan for managing them.	See Odour Management Plan Appendix F
If the technical guidance or your risk assessment shows that noise or vibration are important issues, send us your noise or vibration plan (or both).	N/A – see Table C2-6 above

4 Monitoring

4a Describe the measures you use for monitoring emissions by referring to each emission point in Table 2 above.

See response to Form C3

4b Point source emissions to air only

See response to Form C3

3.4 Form C6

The relevant questions within the form are those applicable to effluent and / or surface water run-off arising from the operation of an installation.

1 About the variation you are applying for

1a Give a brief description of the changes you want to make to your permit

From Point T1 – release via the site drainage system

This effluent is a mixture of waste liquors from the operation of the installation for the anaerobic treatment of separated sewage sludge. It primarily comprises of dewatering liquors returned to the work inlet following the dewatering of treated sewage sludge, along with surface water run off from the cake pad area.

From Point T2 – release via the site drainage system

This effluent is a mixture of waste waters, predominately from surface water management around the primary digesters and other process tanks. It will also include lower constituents such as; biogas condensate; boiler blowdown water; and washdown water.

For both points, the only wastes treated within the installation are sewage related, either being separated from the UWWTD flow in the wider works, or comprise of waste imports, principally of sludge from smaller satellite treatment works, with lower volumes of cess, septic tank and similar sewage related arisings delivered by third parties.

1b Give this effluent a unique name

T1 - Liquor returns

T2 – Liquor returns

1c Is this a release from a dam, weir or sluice ('reservoir release') under Schedule 21 of the EPR meaning of water discharge activity?

No

1d Have you obtained all the necessary permissions in addition to this environmental permit to be able to carry out the discharge (see B6 guidance notes for more details)?

Yes. The discharge is into the inlet of a sewage works controlled by the applicant.

2 About the effluent – how long will you need to discharge the effluent for?

2c Will the discharge take place all year?

Yes, the discharge will take place all year

3 How much do you want to discharge?

3b What is the maximum volume of effluent you will discharge in a day?

350 cubic metres

3c What is the maximum rate of discharge?

4.1 litres / second

3d What is the maximum volume of non - rainfall dependent effluent you will discharge in a day?

350 cubic metres

3f For each answer in question 3, show how you worked out the figure on a separate sheet

3b – based on the maximum daily site input of 350 tonnes, assuming 1 tonne = 1 cubic metre. The liquor arisings must come from the installation inputs as there is limited additional water inputs. Actual discharge will be slightly lower as no allowance has been made for water entrained in the produced sewage cake, but there will be lower volumes inputs like biogas condensate.

3c – this is based on (350m3 / 86400) x1000. Arisings from sources such as dewatering are constant as the plant runs continuously. This gives a value of 4.0509 litres, rounded up to 4.1 litres per second.

3d – based on the maximum daily site input of 350 tonnes, assuming 1 tonne = 1 cubic metre. The liquor arisings must come from the installation inputs as there is limited additional water inputs. This is primarily the outputs from the dewatering plant, which assumes all materials input to the primary digesters end up in the dewatering plant. Actual discharge will be slightly lower as no allowance has been made for water entrained in the produced sewage cake, but there will be lower volumes inputs like biogas condensate.

4 No questions

5 Should your discharge be made to the foul sewer?

5a How far away is the nearest foul sewer from the boundary of the premises?

Not applicable, the site is located within the curtilage of a sewage treatment works and discharges into the works inlet via the site drainage system.

5b2 Discharges from all other premises including trade effluent

Not applicable, the site is located within the curtilage of a sewage treatment works and discharges into the works inlet via the site drainage system.

6 How will the effluent be treated?

6a Do you treat your effluent?

Waste waters generated within the installation are not subject to pre-treatment.

The combined effluent generated by the process of treating sewage and sewage related arisings within the installation is returned to the inlet of the wider sewage treatment works, where it is subject to aerobic treatment in a mixture with UWWTD related waste waters.

6b Fill in Table 2 for each stage of the treatments carried out on your effluent in the order in which they are carried out

Table C6-6b – (Table 2) Treatments carried out on your effluent

Order of Treatment	Code Number	Description

First	09	Primary settlement within sewage works
Second	31	Activated sludge process
Third	03	Tertiary biological treatment

6c You must provide details on a separate sheet of the final effluent discharge quality that the overall treatment system is designed to achieve

The final effluent discharge from the wider sewage treatment works is specified in Environmental Permit MI/T/70/46165/R/006.

7 What will be in the effluent?

7b Are any of the specific substances listed in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' added to or present in the effluent as a result of the activities on the site?

BAT 6&7 sampling returns:

There are no direct emissions to water from the sludge treatment facility. The only indirect emission is of the sludge liquors and surface waters, which are returned to the wastewater treatment works for aerobic treatment under Urban Wastewater regulations. The liquors returned from the sludge treatment facility have originated from wastewater treatment works that are also under the control of Severn Trent Water.

Severn Trent Water have always undertaken periodical sampling of ammonia on the centrate returns with regard to loading impacting the operation of the treatment works. More recently, they have also undertaken shadow sampling twice monthly for Ammonia, Soluble BOD, Total BOD, Orthophosphates and Suspended Solids in return liquors to the inlet, using the sample points noted in the table. Direct regular sampling of these returns is a fairly recent addition to our processes so our understanding of the variance in these returns is developing. COD, BOD, Total Nitrogen, TOC, Ammoniacal Nitrogen, total Phosphorous, suspended solids and pH are directly available at our UKAS accredited contract laboratory and we will begin sampling for these determinands. Not all processes have flow meters on the return lines, assumptions will be made from the throughput of the asset. Temperature would be a field-based measurement, currently this is not measured. STW will aim to sample for PFOS and PFOA on a six-monthly basis to build up a data set, but due to the two weeks analysis turn around, these are not of use to the live operational process.

The data obtained from the return sampling will be used to optimise the process and STW will carry out root cause investigations with the process support teams to understand what changed on site and ensure that we can reduce the risk to the inlet. If any abnormalities are identified in the sample data following root cause investigations, the Process Team will collaborate with wider site based teams and the Catchment team to ascertain the root cause.

As part of the new IED permit and in line with BAT 3, we commit to carrying out further chemical analysis of the waste water, testing for all pollutants expected to be present in the discharge. We are currently in discussion with UKAS accredited laboratories to see what analysis is possible on our leachate returns, and what 'minimum reporting value' is appropriate. This review will be undertaken in line with EA guidance, for example 'Surface Water Pollution Risk Assessment for your environmental permit', and 'Monitoring Discharges to Water'. The sampling will be undertaken by our suitably trained internal teams that already undertake compliance sampling for EA discharge permits to MCERTS standards. Analysis will be contracted to UKAS accredited laboratories.

7c Have any of the specific substances listed in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' been detected in samples of the effluent or in the sewerage catchment upstream of the discharge?

Please see previous answer.

7d Are there any other harmful or specific substances in your effluent not mentioned in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater'?

At present, no sampling or analysis for all substances listed within the referenced risk assessment at the site has been undertaken. A review of the MSDS sheets for chemicals used within the installation does not indicate the presence of any other harmful or specific substances within the effluent.

7e If you have answered 'No' to any of questions 7a to 7d provide details on a separate sheet of how you have established that the effluent is not likely to contain specific substances

A review has been undertaken of the relevant MSDS sheets for chemical used routinely within the installation to look for substances identified within the risk assessments listed. Discussions are being held with the local catchment team, to identify any known sources of these materials within the sewage works catchment area.

7f What is the maximum temperature of your discharge?

20°C back into the sewage works

7g What is the maximum expected temperature change compared to the incoming water supply?

0°C

8 Environmental risk assessments and modelling

8b Discharges to lakes, estuaries, coastal waters or bathing waters

The installation does not discharge to lakes, estuaries, coastal waters or bathing waters

8d Discharges to groundwater

The installation does not discharge to groundwater

8e Discharges to freshwater (non - tidal) rivers from an installation, including discharges via sewer

No modelling has been undertaken on the output from the installation at present, due to a lack of quality data and confirmation of flows. The final effluent discharge from the wider works, which includes the installation arisings has previously been subjected to modelling as part of the environmental permitting discharge application process.

8f Environmental impact assessment

No environmental impact assessment has been carried out on the installation, as it is an existing facility.

9 Monitoring arrangements

9a What is the national grid reference of the inlet sampling point? (for example, SJ 12345 67890)

Not applicable to this installation

9b What is the national grid reference of the effluent sample point?

Current sampling occurs at the final effluent point: SK 54830 62420

9d What is the national grid reference of the flow monitoring point?

No flow meter installed

9e Does the flow monitor have an MCERTS certificate?

No. No flow meter installed

9f Do you have a UV disinfection efficacy monitoring point?

No. Not installed as part of this installation.

9h You should clearly mark on the plan the locations of any of the above that apply to this effluent

Please see site emission point plan.

10 Where will the effluent discharge to?

10a Where the effluent discharges to

Non - tidal river, stream or canal

Appendix 5 – Discharges to non - tidal river, stream or canal

A5.1 Give the discharge point a unique name For example, 'Outlet 1' (you must use this name to identify the discharge point on the plan)

Final Effluent Outlet

A5.2 Give the national grid reference of the discharge point

SK 54830 62420

A5.3 Give the name of the watercourse, canal or the main watercourse it is a tributary of if you know it

River Maun

A5.4 Is the discharge into a:

Non - tidal river

A5.5 Does the discharge reach the watercourse or canal by flowing through a surface water sewer?

No

A5.6 Does the watercourse dry up for part of the year?

No

A5.61 If the watercourse does dry up for part of the year can you indicate a typical period when the surface water runs dry each year – start and finish (in months)

N / A

A5.6.2 If the watercourse does dry up for part of the year, how many metres downstream of the discharge is it before the discharged effluent soaks in?

N / A

A5.7 Is the discharge made to a roadside drain or ditch?

No

10b Is this effluent discharged through more than one outlet?

No

10c If you answered yes to question 10b above make sure you show clearly on your discharge point appendix or appendices and site plan that this one effluent can discharge to more than one discharge point

N / A

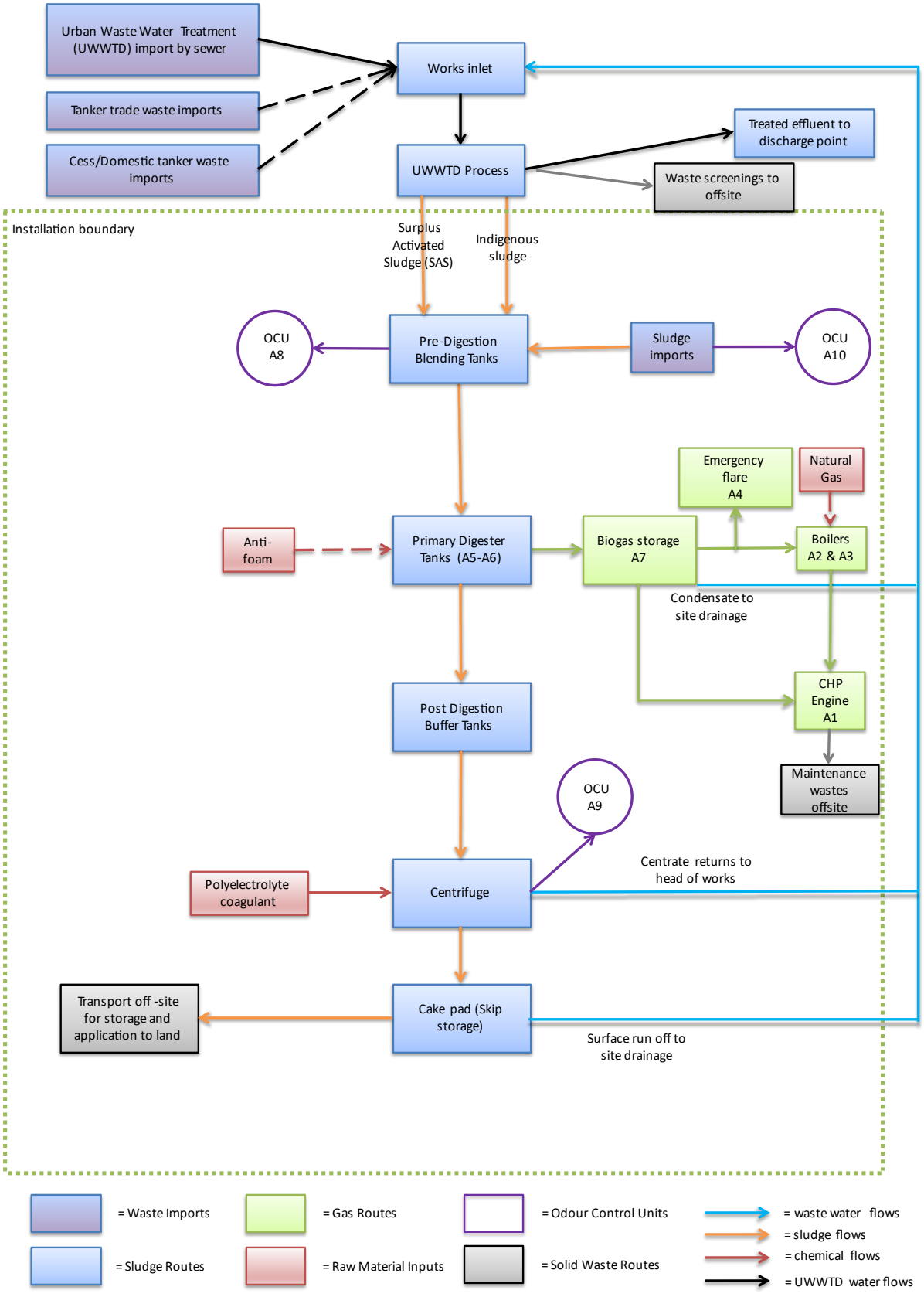
Appendix A. Figures

A.1.1 Site location plan

A.1.2 Site layout plan

A.1.3 Site drainage plan

A.1.4 Process flow diagram



Appendix B. Certificates

Appendix C. Air Dispersion Modelling Report

Within this variation application for Mansfield STW, EPR/GP3704PP/V002, there is a request to add additional air emission sources to the currently permitted CHP engine at the site.

For clarity, the site has 4 potential combustion emission sources (all values refer to thermal inputs):

- Emergency flare. As this is for emergency use only, it is excluded from the requirement for air dispersion modelling;
- CHP engine, 1.3MW, currently permitted under MCPD;
- Boiler 1, 0.65MW, currently unpermitted; and
- Boiler 2, 0.65MW, currently unpermitted.

Both boilers at the site are dual fuelled on natural (mains) gas and diesel

In total, this is a thermal input of 2.7MW, of which 1.3MW is currently permitted.

Operationally, the primary user of biogas at the facility, is the CHP engine. This combusts biogas to provide both electricity to the site and for export to the national grid; and heat, which provides supplementary heat to the anaerobic digesters located at the site, should they require it, due to the prevailing temperature.

In the event that the digester temperature cannot be maintained using the heat from the CHP engine, one or more of the boilers would then be used to provide additional heat. In addition, should the CHP engine be unavailable, for example during periods of maintenance, the boilers would be operated to control biogas levels.

The operational hours of the CHP engine are around 8,760 hours per annum. The boilers will be run at a more limited rate. Although the application states under 4,000 hours per annum for each boiler, in reality these units are typically run for around 1,000 hours per annum. The higher value in the application is to allow for cooler periods and any prolonged period of unavailability for the CHP. The boilers have been located on site for a number of years, with an installation date of pre 2010, and are scheduled to be permitted under MCPD by 2029, unless they are subject to replacement before that date.

In total, the normal operational hours for combustion units at the site will be in the range 10,760 – 16,760 hours per annum, with 8,760 hours (CHP engine) being currently permitted.

Table 1: Dispersion modelling parameters

Parameters	**Unit**	**ENER-G 425B CHP engine (1.1 MW_{th})**	**Boiler (0.7 MW_{th})**	**Boiler (0.7 MW_{th})**
Modelled fuel	-	Biogas	Biogas	Biogas
Emission point	-	A1	A2	A3
Assessed annual operation hours	Hours	8,760	8,760	8,760
Stack location	m	E 454739 N 362229	E 454733 N 362235	E 454724 N 362259

Parameters	Unit	ENER-G 425B CHP engine (1.1 MW_{th})	Boiler (0.7 MW_{th})	Boiler (0.7 MW_{th})
Stack height	m	5.14	6.0	6.0
Stack diameter	m	0.25	0.30	0.30
Flue gas temperature	°C	180	150	150
Efflux velocity	m/s	17.8	9.8	9.8
Moisture content of exhaust gas	%	11.4	8.1	8.1
Oxygen content of exhaust gas (dry)	%	8.5	6.4	6.4
Volumetric flow rate (actual)	m^3/s	0.876	0.691	0.691
Volumetric flow rate (normal)[1]	Nm^3/s	0.983	0.332	0.332
NOx emission concentration[1,]	mg/Nm^3	186	250	250
NOx emission rate	g/s	0.182	0.083	0.083
CO emission concentration[1]	mg/Nm^3	519	100	100
CO emission rate	g/s	0.511	0.033	0.033
PM_{10} / $PM_{2.5}$ emission concentration[1]	mg/Nm^3	2.7	5.0	5.0
PM_{10} / $PM_{2.5}$ emission rate	g/s	0.003	0.002	0.002
SO_2 emission concentration[1]	mg/Nm^3	130 (60 after 1st January 2030)	200	200
SO_2 emission rate	g/s	0.128	0.066	0.066
TVOC emission concentration[1]	mg/Nm^3	371	1,126	1,126
TVOC emission rate	g/s	0.365	0.373	0.373

Note 1: Normalised flows and concentrations presented at 273 K, 101.3 kPa, dry gas and oxygen content of 15% (CHP engine) or 3% (boilers).

Table 2: Preliminary results of assessment at sensitive human receptor locations

Pollutant	Averaging period	Assessment location	EQS (µg/m^3)	PC (Scenario 1 – CHP only) (µg/m^3)	PC (Scenario 2 – boilers only) (µg/m^3)	PC (Scenario 3 – all sources) (µg/m^3)
CO	Maximum 8-hour running mean	Sensitive human receptor locations	10,000	69.38	9.44	78.83
	Maximum 1-hour mean		30,000	108.57	18.08	116.92
NO_2	Annual mean		40	1.44	1.24	2.67
	1-hour mean (99.79th percentile)		200	7.30	12.00	14.54
SO_2	24-hour mean (99.18th percentile)		125	5.39	5.93	10.65
	1-hour mean (99.73rd percentile)		350	14.42	24.79	31.15
	15-minute mean (99.9th percentile)		266	25.46	41.98	42.99
PM_{10}	Annual mean		40	0.03	0.04	0.08
	24-hour mean (90.41st percentile)		50	0.08	0.10	0.18
$PM_{2.5}$	Annual mean		25	0.03	0.04	0.08
TVOC	Annual mean		n/a	4.13	7.98	12.06
	Maximum 1-hour mean			77.55	204.34	208.05

Table 3: Results of initial assessment at assessed protected conservation areas

Ref	Protected Conservation Area	EQS (µg/m^3)	PC (Scenario 1 – CHP only) (µg/m^3)	PC (Scenario 2 – boilers only) (µg/m^3)	PC (Scenario 3 – all sources) (µg/m^3)
Annual mean oxides of nitrogen					
H1	Birklands & Bilhaugh SAC	30	0.01	0.01	0.03
H2	Maun Valley Park LNR		3.68	3.36	6.95
H3	Ravensdale LNR		0.84	0.73	1.57

H4	Woodhouse Grassland LWS		0.10	0.11	0.21
H5	Debdale Lane Grassland LWS		0.03	0.03	0.06
H6	Racecourse Recreation Ground LWS		0.03	0.03	0.06
Maximum daily mean oxides of nitrogen					
H1	Birklands & Bilhaugh SAC	75	0.18	0.18	0.34
H2	Maun Valley Park LNR		20.54	16.45	34.57
H3	Ravensdale LNR		9.97	7.83	17.63
H4	Woodhouse Grassland LWS		1.10	1.28	2.38
H5	Debdale Lane Grassland LWS		0.82	0.68	1.50
H6	Racecourse Recreation Ground LWS		0.48	0.50	0.93
Annual mean sulphur dioxide					
H1	Birklands & Bilhaugh SAC	20	0.01	0.01	0.02
H2	Maun Valley Park LNR		2.59	2.67	5.19
H3	Ravensdale LNR		0.59	0.58	1.17
H4	Woodhouse Grassland LWS		0.07	0.09	0.16
H5	Debdale Lane Grassland LWS		0.02	0.02	0.04
H6	Racecourse Recreation Ground LWS		0.02	0.02	0.05

The closest habitats site to the sewage works, is the Maun Valley Park LNR which is, which is adjacent to the eastern site boundary. The nearest SAC is approximately 8.5km away, with no ancient woodlands or SSSI within 2km of the site. The nearest human receptors are houses approx. 200m east, or the industrial park 50m west.

The background levels for NOx and SOx at the site are 15.7µg/m3 and 12.9µg/m3 respectively, and these values will include any contribution from the boilers as they are existing units. These values are under 50% of the UK air quality standard for NOx of 40µg/m3.

The CHP engine was permitted during 2019 under MCPD, as part of which, ADMS modelling was undertaken on its emission. The modelling included the impact at the local habitats sites, a SAC, which was within the relevant distances from the site for consideration as well as a number of LNR and LWS.

The modelling concluded that that the CHP engine was unlikely to result in any unacceptable impacts on air quality at any sensitive human receptors or at the sensitive ecological receptors included in the assessment. The habitats assessment considered the annual and maximum daily means for the NOx and SOx deposition at habitats sites.

For the annual mean NOx, the modelling showed that for the Birklands & Bilhaugh SAC, the Process Contribution (PC) were below 1% and the Predicted Environmental Concentrations (PECs) were less than 60% of the critical level and the emission is not likely to have a significant effect. The PECs ranged from 30-55%.

Therefore, there is headroom within the modelled results for additional deposition, prior to exceeding the PEC of 70% for any of the modelled species. The boilers will add to the PEC from the site, however, the additional thermal input, on a limited operational hours basis, would not lead to a PEC exceedance.

Appendix D. BAT Assessment

Please see appended excel spreadsheet

Appendix E. Site Spill Risk Assessment and Containment Report

Appendix F. H5 Site condition report

SITE CONDITION REPORT TEMPLATE

For full details, see H5 *SCR guide for applicants* v2.0 4 August 2008

COMPLETE SECTIONS 1-3 AND SUBMIT WITH APPLICATION

DURING THE LIFE OF THE PERMIT: MAINTAIN SECTIONS 4-7

AT SURRENDER: ADD NEW DOC REFERENCE IN 1.0; COMPLETE SECTIONS 8-10; & SUBMIT WITH YOUR SURRENDER APPLICATION.

1.0 SITE DETAILS	
Name of the applicant	Severn Trent Water Limited
Activity address	Mansfield Sewage Treatment Works, Old Mill Lane, Mansfield, Nottinghamshire, United Kingdom NG18 2DA
National grid reference	SK 54730 62257

Document reference and dates for Site Condition Report at permit application and surrender	Application for bespoke Permit, August 2021

Document references for site plans (including location and boundaries)	Please see site plan in Appendix A.

Note:
In Part A of the application form you must give us details of the site's location and provide us with a site plan. We need a detailed site plan (or plans) showing:

- Site location, the area covered by the site condition report, and the location and nature of the activities and/or waste facilities on the site.
- Locations of receptors, sources of emissions/releases, and monitoring points.
- Site drainage.
- Site surfacing.

If this information is not shown on the site plan required by Part A of the application form then you should submit the additional plan or plans with this site condition report.

2.0 Condition of the land at permit issue	
Environmental setting including: • geology • hydrogeology • surface waters	According to the Environment Agency's online flood maps, the permitted parts of the site are in flood zone 1 with a greater than 1:1000 chance of flooding in any year, although some eastern areas of the site are in flood zone 2. The site sits within a Source Protection Zone 3 for total catchment. The geology of the site comprises the following sequence: Alluvium (sands and gravels) underlain by clay with bedrock of Lenton sandstone. The superficial drift is classified as unproductive, while the bedrock is a principal aquifer. The nearest surface water body is the River Maun to the immediate east of the site.
Pollution history including: • pollution incidents that may have affected land	The site is to the north east of Mansfield town centre, alongside the River Maun. It was undeveloped agricultural land up until the period 1916-18 when it first appears on local

• historical land-uses and associated contaminants • any visual/olfactory evidence of existing contamination • evidence of damage to pollution prevention measures	maps as a sewage disposal works, including filter beds and other tanks. The site has undergone a number of improvements and changes since that period. The areas to the east and south of the site previously held cotton mills and similar industrial premises. These industries have disappeared by 1967 and housing has increased on all sides of the works. The area occupied by the school and industrial park are still shown as open land in this period. These properties first appear on maps around 1989. Note that the old maps show a culverted drain running alongside the works from a weir to the south of the works, under the road to the north, where it ends at the river. This drain is shown on maps between 1963 and 1977, but may have existed outside this period
Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)	Unknown
Baseline soil and groundwater reference data	None collected
Supporting information	• Source information identifying environmental setting and pollution incidents • Historical Ordnance Survey plans • Site reconnaissance • Historical investigation / assessment / remediation / verification reports • Baseline soil and groundwater reference data

3.0 Permitted activities	
Permitted activities	Operation of an anaerobic digestion plant for sewage sludge waste and imported sewage sludge wastes and combustion of biogas within a CHP engine to generate electricity for use on site.
Non-permitted activities undertaken	Discharging of waste Storage of waste Storage of biogas Physical blending of wastes Storage of raw materials
Document references for: • plan showing activity layout; and • environmental risk assessment.	Please see Technical Summary in Chapter 2 of main application document

Note:

In Part B of the application form you must tell us about the activities that you will undertake at the site. You must also give us an environmental risk assessment. This risk assessment must be based on our guidance (*Environmental Risk Assessment - EPR H1*) or use an equivalent approach.

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

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

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

4.0 Changes to the activity	
Have there been any changes to the activity boundary?	Yes. Please see permit boundary plan in permit application. The permit now covers a large area of the site, compared to the previous point source emissions only
Have there been any changes to the permitted activities?	Yes. The original permit applied solely to the emissions from the CHP engine on site. The revised permit includes all sludge treatment operations at the site, from the thickening plant onwards, including the import of sludge from other works, through to dewatering and removal of cake from site. The CHP and boilers, along with the associated biogas transfer and storage plant are in scope.
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	No
Checklist of supporting information	• Plan showing any changes to the boundary (where relevant) • Description of the changes to the permitted activities (where relevant) • List of 'dangerous substances' used/produced by the permitted activities that were not identified in the Application Site Condition Report (where relevant)

5.0 Measures taken to protect land	
Use records that you collected during the life of the permit to summarise whether pollution prevention measures worked. If you can't, you need to collect land and/or groundwater data to assess whether the land has deteriorated.	
Checklist of supporting information	• Inspection records and summary of findings of inspections for all pollution prevention measures • Records of maintenance, repair and replacement of pollution prevention measures

6.0 Pollution incidents that may have had an impact on land, and their remediation

Summarise any pollution incidents that may have damaged the land. Describe how you investigated and remedied each one. If you can't, you need to collect land and /or groundwater reference data to assess whether the land has deteriorated while you've been there.	
Checklist of supporting information	• Records of pollution incidents that may have impacted on land • Records of their investigation and remediation

7.0 Soil gas and water quality monitoring (where undertaken)

Provide details of any soil gas and/or water monitoring you did. Include a summary of the findings. Say whether it shows that the land deteriorated as a result of the permitted activities. If it did, outline how you investigated and remedied this.	
Checklist of supporting information	• **Description of soil gas and/or water monitoring undertaken** • **Monitoring results (including graphs)**

8.0 Decommissioning and removal of pollution risk

Describe how the site was decommissioned. Demonstrate that all sources of pollution risk have been removed. Describe whether the decommissioning had any impact on the land. Outline how you investigated and remedied this.	
Checklist of supporting information	• **Site closure plan** • **List of potential sources of pollution risk** • **Investigation and remediation reports (where relevant)**

9.0 Reference data and remediation (where relevant)

Say whether you had to collect land and/or groundwater data. Or say that you didn't need to because the information from sections 3, 4, 5 and 6 of the Surrender Site Condition Report shows that the land has not deteriorated. If you did collect land and/or groundwater reference data, summarise what this entailed, and what your data found. Say whether the data shows that the condition of the land has deteriorated, or whether the land at the site is in a "satisfactory state". If it isn't, summarise what you did to remedy this. Confirm that the land is now in a "satisfactory state" at surrender.	
Checklist of supporting information	• Land and/or groundwater data collected at application (if collected) • Land and/or groundwater data collected at surrender (where needed) • Assessment of satisfactory state • Remediation and verification reports (where undertaken)

10.0 Statement of site condition

Using the information from sections 3 to 7, give a statement about the condition of the land at the site. This should confirm that:

- the permitted activities have stopped
- decommissioning is complete, and the pollution risk has been removed
- the land is in a satisfactory condition.

Appendix G. Odour Management Plan

Appendix H. Waste Procedures