



Bioresources Permitting

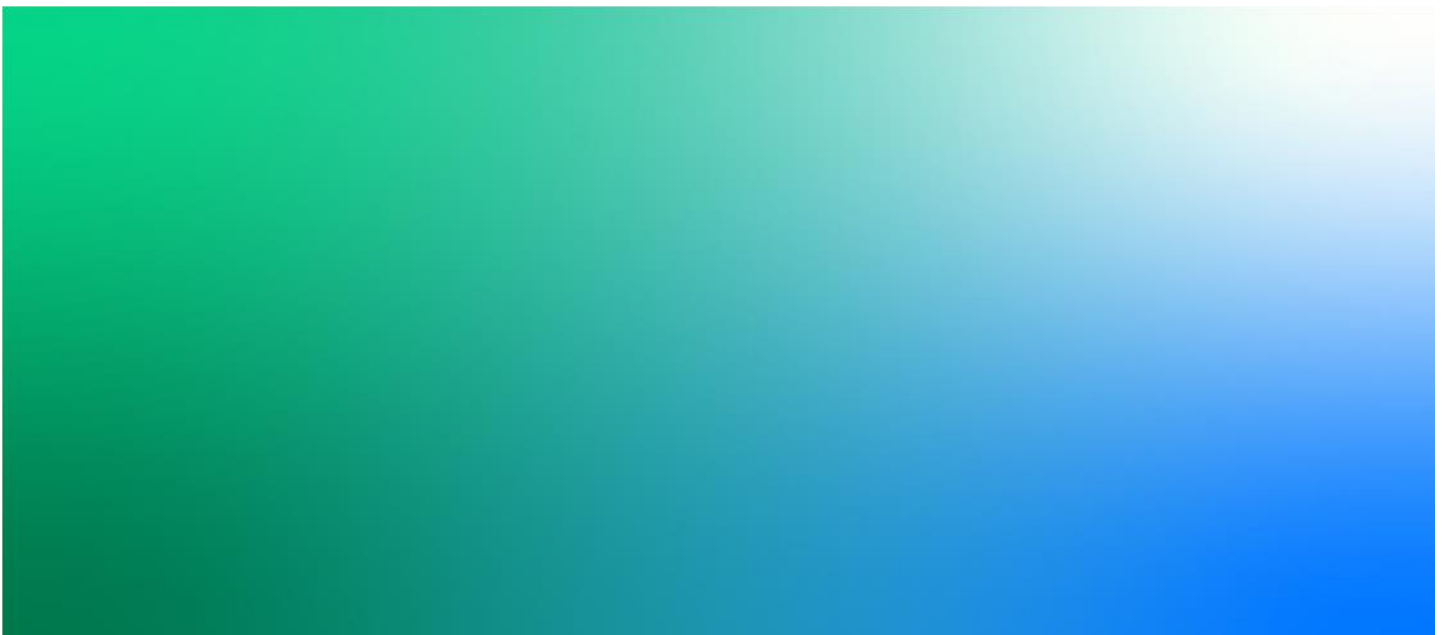
Alfreton STW Substantial Variation Application

| 3

January 2024

Severn Trent Water Ltd

EPR/GP3690CH/V002



Bioresources Permitting

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Jacobs U.K. Limited

2 Colmore Square
 38 Colmore Circus
 Queensway
 Birmingham
 B4 6BN
 T +44 (0)121 237 4000
www.jacobs.com

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Document history and status

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1. Introduction

This application relates to a substantial variation application for a bespoke installation bioresources treatment permit for the Alfreton Sewage Treatment Works, operated by Severn Trent Water Ltd.

The site is currently permitted for the import of non-hazardous wastes for treatment within the wider sewage works. This permit will be merged with the installation permit.

This substantial permit variation application relates to the addition of a listed activity to the site, that of biological treatment of waste under the Industrial Emissions Directive. It relates to the non-urban waste water treatment directive (UWWTD) treatment of indigenous UWWTD derived sludge and imported UWWTD sludges from other works and cess and septic tank imported material which is of a similar composition. Note that these operations are currently operated at the site, under the UWWTD and The Controlled Waste Regulations 2012 (paragraph 3 exclusion). The anaerobic digestion process will require an extension to the current site boundary.

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

A bespoke installation permit is required for this site due to the site not meeting the standard rules infrastructure requirements.

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 environmental permit EPR/GP3690CH (EAWML43529) 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.

The current older style waste management licence (now environmental permit) for the site covers the import of suitable wastes to the site for treatment through the sewage works. The existing permit has three separate import points listed, with a single EWC list applying to all three points.

The anaerobic digestion process treats sewage sludge arising from the indigenous treatment of UWWTD derived materials supplied to the site by the sewer network and from tanker imports of waste materials to the works that are similar in composition to UWWTD derived materials. Indigenous sludge is mixed with imports of waste sludges from other sewage treatment plants and subject to biological treatment via anaerobic digestion within one of two anaerobic primary digester tanks located on site. Previously, sewage treatment sites operated by sewerage undertakers importing sludges and liquids were only regulated for the import and treatment of these materials to the wider site and indigenous sludges arising from the treatment of sewage was not required to be included in a permit. It has now been determined that the treatment of indigenous sludges do need to be permitted as they fall outside of the Urban Waste Water Treatment Directive (UWWTD).

This variation application is:

- To incorporate the addition of a new listed activity to the permit, that of biological treatment by anaerobic digestion, to make this an installation permit;
- To include with the permit 1x CHP units and 3x boilers. The CHP is classified as a 'new plant' and the boilers as 'existing plant' under the medium combustion plant directive (MCPD);

- To increase the overall waste throughput of the site to include both imported and indigenous derived sewage and similar wastes;
- To update the existing waste import permit to modern standards; and
- To amend the site boundary to include the area of the anaerobic digestion plant and directly associated activities.

The installation covers the biological treatment of sewage sludge, both indigenous and imported from other waste water treatment sites, in a mixture with imported cess and septic tank derived wastes, by anaerobic digestion, with a capacity above the relevant threshold. There are a number of directly associated activities, including the operation of one biogas fuelled CHP unit for the generation of electricity and heat at the site, which is classified as 'new plant' under the Medium Combustion Plant Directive. There is a second listed activity at the site relating to the operation of a liquor treatment plant at the site, for the treatment of dewatering liquors.

The site is located in a rural setting to the north of Alfreton on the outskirts of the town. The Alfreton Brook runs to the north of the site across agricultural land.

The waste activity comprises an offloading coupling for tankers and cess vehicles to discharge through, located at the pre-digestion tanks. All tanker imports are passed through a logger to record the incoming volume and the company carrying out the import. The import is temporarily held in a sludge tanker import storage tank and passes through grit and rag removal screens. Once the tanker waste has mixed with the incoming UWWTD material, its treatment falls outside the scope of the Environmental Permitting Regulations.

The installation is for the biological treatment of non-hazardous wastes by means of anaerobic digestion. It also comprises an import point for cess and septic tank imported materials from third parties to join the UWWTD route for aerobic treatment. This material is transferred with the indigenous sludge separated from the main aerobic treatment flow.

Indigenous sludges from the UWWTD route come from three pre-digestion tanks and tankered sludge imports enter from the tankered import storage tank and the rag and grit removal screens, prior to transfer to one of the two primary anaerobic digesters located at the site. Both digesters are above ground tanks and manufactured of concrete. The digesters both have external steel insulating skins, and operate on a batch process basis, that is incoming sludge is added to the process as digested sludge is removed. Removed sludge is transferred to one of four, above ground, concrete, open topped, post-digestion tanks to ensure that the required level of digestion is achieved. Following this, fully digested sludge is transferred to site dewatering equipment, where, following the addition of polyelectrolyte based coagulant, it is dewatered by centrifuge and stored on the sites open cake pad. The site has a secondary cake pad to use as additional storage for cake. Treated cake is removed from the pad for landspreading under the Sludge Use in Agriculture Regulations 1989, in accordance with the Biosolids Assurance Scheme (BAS).

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 1.6MWth CHP engine which is a 'new plant' under the medium combustion plant directive. It generates electricity for use within the site and heat to maintain primary digester temperature. Biogas can also be used in three dual fuelled auxiliary boilers. 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 an emergency flare. This is utilised under 10% of the year.

2. Technical Description

This application is for the substantial variation of the site's existing 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 sewage sludge and imported sewage sludge and other wastes for treatment by anaerobic digestion for the Alfreton Sewage Treatment Works, operated by Severn Trent Water Ltd (Severn Trent).

This variation application also includes the addition of a new biogas fuelled CHP and existing boilers which fall under the medium combustion plant (MCP) as defined by Schedule 25A of the Environmental Permitting Regulations (EPR) 2018. The boilers are not Specified Generators under Schedule 25B of EPR 2018.

Scope

The substantial variation to the permit is to include two new listed activities.

The first is the biological treatment by anaerobic digestion, of indigenous sewage sludge in a mixture with imported cess and septic tank derived wastes.

The second listed activity at the site relates to the operation of a liquor treatment plant at the site for the treatment of dewatering liquors prior to transfer back into the UWWTD route.

In addition, the variation includes the operation of a biogas fuelled CHP engine and boiler units for the generation of heat (when needed) to the primary digesters. The CHP is classified as 'new plant' and the boilers as 'existing plant' under the Medium Combustion Plant Directive. The site operates 24 hours per day with the site being unstaffed overnight. A standby rota picks up alarms overnight.

Setting

The site is located in a semi-rural setting on the outskirts of Alfreton, with the town situated to the immediate South of the site. To the immediate East is open arable farmland for approximately 730m to a railway track heading North to South. There is a small track which runs parallel to the Northern site boundary that gives access to the farmers field to the East. Immediately West of the site is more open arable farmland for approximately 420m to Chesterfield Road which also runs North to South. The Alfreton Brook runs 40m from the site and runs parallel to the Northern boundary. The B6025 lies approximately 70m from the Brook and also runs parallel to the Northern boundary. A small road provides access to the site from the B6025 and includes a bridge over the Brook. The majority of the land beyond the B6025 is more farmland with a small power station adjacent to the road 140m from the site, and farm buildings approximately 400m and 520m from site. Industrial and commercial buildings are immediately South of the site for approximately 1km South East to the railway mentioned earlier. There is a patch of allotments 70m South of the site and is separated by trees for screening. Alfreton lies beyond the allotments approximately 230m South of the site. This includes schools 240m and 340m from the site, playing fields 380m away and a cemetery 450m South of the site.

The site sits entirely within a flood zone 1, indicating that it has a low probability of flooding having less than 1:1000 annual probability of river or sea flooding in any year. The Alfreton Brook immediately North of the site lies in flood zone 3 (high probability of flooding, greater than 1:100 annual probability of flooding), with a small buffer in land zone 2 (medium probability of flooding, between 1:100 and 1:1000 annual probability of flooding). The site is not located within a designated source protection zone (SPZ). There are nine Local Woodland sites and one area of ancient woodland within 2km of the site. Carnfield Wood ancient woodland is 1.2km south east and also forms part of a local wildlife site – Carnfield Wood and Outseats Alfreton Tunnels. The closest ecologically sensitive areas are Pond Wood, Alfreton and Alfreton Parkway Railway Land Carnfield Hill, which are 610m west and 840m east respectively. The other seven local wildlife sites lie within 1,100m and 1,500m south east to north east of the site. There are no LNRs, NNRs or SSSIs within 2km of the site and there are no SACs, SPAs, MPAs or Ramsar Sites within 10km. The site is located directly adjacent to the South Normanton Air Quality Management Area (AQMA), Barlborough AQMA no.1 and Barlborough AQMA No. 2.

Existing Permit

There are three permitted import routes to the site, in accordance with the current environmental permit at the site. These will be split under the varied permit to one import relating to a waste management activity and two for imports to the listed activities at the site.

Waste Activity

The waste activity comprises an offloading coupling for tankers to discharge through, located at the works inlet. All imports are passed through a logger to record the incoming volume and the company carrying out the import. The import is directly into the works inlet, with no holding or blending tanks before the import. The waste codes for imported waste accepted at the installation are detailed in Form C3, Table C3-1b. Once the tanker trade waste has mixed with the incoming UWWTD material, its treatment falls outside the scope of the Environmental Permitting Regulations. This activity is currently permitted and the existing permit incorporated into this variation.

In addition to the offloading route for the works inlet, there is an existing, permitted, offloading point direct to the Liquor Treatment Plant (LTP) which may be used for 'high strength' liquid wastes, that is waste imports which have elevated ammonia concentrations, which the LTP can pre-treat prior to transfer to the works inlet.

Anaerobic Digestion Process

Within the installation boundary there is an offloading coupling for tankers to discharge UWWTD derived sludge from other waste treatment sites. Imports are passed through a logger and volumes monitored.

Sludge is offloaded into one of four sludge storage tanks and passes through a logger to record the incoming volume of sludge, with the imported sludge being blended with thickened indigenous SAS and indigenous primary sludges prior to the biological treatment process in one of three pre-digestion blend tanks. Blended, dewatered sludge is treated in one of two above ground primary anaerobic digesters which are of concrete construction. Each of the primary digesters are fitted with two pressure relief valves (PRVs), which operate in an emergency only. The digesters operate on a continual basis with incoming sludge added to the process as digested sludge is removed. Digested sludge is transferred to one of 4 open topped, above ground, steel, post digestion tanks (pathogen kill tanks) at the site for additional pathogen kill.

Sludge is held within each primary digester and post digestion tank for the period specified by the site's HACCP (hazard and critical control point) plan for the Sludge (Use in Agriculture) Regulations. The digested sludge is then mixed with a polymer coagulant and imported digested sludge and dewatered using the centrifuges on site.

Liquor Treatment Plant

The supernatant dewatering liquors are transferred to a liquor treatment plant, (LTP), consisting of an LTP balancing tank and an LTP aeration tank, for pre-treatment prior to their return to the inlet of the UWWTD works. This treatment process is to reduce the ammonia concentration within the dewatering liquors, through a combination of aerobic treatment and pH adjustment, through the addition of caustic soda to the plant. The plant is open topped, due to its aerobic nature and treated effluent is returned to the STW inlet for further aerobic treatment via the UWWTD treatment route. This is a separately listed activity, as the output from this process goes for disposal (final release to water). The chemical tanks for the liquor treatment plant are located within a bund to 110% of their capacity.

In accordance with the current permit, where high ammonia wastes are delivered by tanker to the site, these may be offloaded directly to the liquor treatment plant, via a tank coupling point and data logger, in order to reduce their ammonia concentrations, prior to treatment via the UWWTD route.

Cake Output

The sludge cake is transferred to one of two open, engineered cake pad following dewatering using a single centrifuge, following the addition of polymer to aid coagulation of sludge. The cake is analysed to check compliance with Sludge (Use in Agriculture) Regulations (1989) (SUiARs), in accordance with the Biosolids Assurance Scheme (BAS) and once the cake is confirmed to be compliant it is removed from site for land spreading.

Digested sludge can be imported from other waste water treatment sites for dewatering within the site dewatering plant.

In the event that non-compliant sludge is produced, it will be segregated on the second cake pad (the one further from the centrifuge), where it will be treated with lime in order to meet the required pathogen kill requirements under BAS and SUiAR. Assuming the cake is stacked up 1.5m high on the pad, the total cake storage at the site is 6,498m³.

Liquor Returns

Liquor returns, both from the anaerobic digestion area and from the LTP outputs, are returned to the inlet, downstream of the storm offtake and therefore, their treatment is unaffected by the site being in storm conditions.

Biogas

Biogas from the primary digesters is captured in the floating roof section of the digesters and transferred to a telescopic roof gas holder. Biogas can then be combusted within the CHP engine on site, which run on biogas only and provide 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 three dual fuelled auxiliary boilers and an emergency flare 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 biogas line is also equipped with a siloxane filter to remove siloxane from the biogas on site to preserve engine life.

The site has a CHP engine with a thermal input of 1.6MWth. It is equipped with a vertical stack, unimpeded by cowls or flaps. This is classified as a 'new plant' under the Medium Combustion Plant Directive, being installed in May 2023. 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 three dual fuelled auxiliary boilers and an emergency flare. The flare is utilised under 10% of the year. Biogas concentrations of siloxanes are monitored at the site and the concentrations present assessed as not requiring removal using siloxane filtration.

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 organisations CMS and training program.

Return Liquors Treatment

The existing liquor treatment plant discharges back to the works inlet, via the site drainage system, in a mixture including other waste waters from within the installation, including condensate, surface water run off and cleaning water. These liquors have elevated concentrations of ammonia and Biological Oxygen Demand (BOD), as well as potentially elevated suspended solids. The ammonia level has been reduced through pre-treatment

within the liquor treatment plant. These return liquors are not currently subject to routine monitoring and measurement, although some limited monitoring has been undertaken for OFWAT reporting purposes.

The returned liquors are subject to treatment within the UWWTD part of the wider sewage work. The wider UWWTD works treats the return liquors using the following techniques:

- Primary treatment – both gross contaminant removal using rag screens and degritting, as well as primary settlement are utilised;
- Secondary treatment using primary and secondary biological filters;
- Tertiary treatment using sand filtration.

The Environment Agency H1 guidance states that BOD should be completely removed by these processes, with ammonia concentrations being reduced by 96%. Final effluent quality complies with the requirements of the UWWTD sites Water Discharge Environmental Permit.

Tank Type	Number	Volume (each)	Construction
Primary digester	2	2200m ³	Concrete
Post digestion tanks	4	2000m ³	Concrete
Pre-digestion tanks	3	800m ³	Steel
Sludge storage tanks	2	150m ³	Steel
	2	150m ³	Concrete
LTP balancing tank	1	225m ³	Concrete
LTP aeration tank	1	225m ³	Concrete

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 H.

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

Open Topped Tanks

There are a number of open top tanks within the permit boundary at Alfreton STW, including the sludge storage tanks and post digestion 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 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.

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 following treatment in the LTP, under Urban Wastewater regulations. The liquors returned from the sludge treatment facility via the LTP 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 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 processes so 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 determinants. 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, STW commit to carrying out further chemical analysis of the waste water, testing for all pollutants expected to be present in the discharge. STW are currently in discussion with UKAS accredited laboratories to see what analysis is possible on 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 suitably trained internal teams that already undertake compliance sampling for EA discharge permits to MCERTS standards. Analysis will be contracted to UKAS accredited laboratories.

Other Considerations

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

The site has an odour management plan which is supplied as Annex F.

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 for the primary activity, that of anaerobic digestion, 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;*

The listing for the liquor treatment plant is:

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

- *Part A(1) (a) Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC concerning urban waste-water treatment(a)—*
 - (i) biological treatment;*

In addition to the listed activity at the site, there is a directly associated activity of a biogas combustion plant which is also a specified generator, covered by the Medium Combustion Plant Directive under Schedule 25A and B of the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

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

- Import of sewage sludge, cess and septic tank wastes, and digested sludge;
- Storage of digestate prior to dewatering;
- Dewatering of digested sewage sludge;
- Transfer of centrate back to the head of the sewage treatment works;
- Storage of dewatered sewage cake prior to offsite recovery;
- Storage of biogas;
- Combustion of biogas in MCPD and SG compliant biogas CHP unit and auxiliary boilers;
- Emergency flare; and
- Storage of raw materials.

The waste activity at the site is the import of liquids and thin sludges for aerobic biological treatment.

3. Application Form Questions:

3.1 Form C2

1 About the permit

1a Discussions before your application

None

1b Permit number

What is the permit number that this application relates to?

EPR/GP3690CH/V002 issued 05/10/2010

1c Site details

What is the site name, address and postcode of the site?

Severn Trent Water Limited
 Alfreton Sewage Treatment Works
 Rodgers Lane,
 Alfreton,
 DE55 6AW

Grid reference: SK 41257 56715

2 About your proposed changes

2a Type of variation

What type of variation are you applying for?

Substantial variation

2b Changes or additions to existing activities

Table C2-1 Proposed changes to current activities

Name	Installation schedule 1 references	Description of the installation activity	Description of waste operations	Proposed changes document reference
Alfreton STW	S5.4A1(b)i – operation of an anaerobic digester >100tpd	Import of sewage sludge from works for treatment by anaerobic digestion and the recovery of treated sludge cake		
Alfreton STW	S5.4A1(a)i – operation of a	Operation of liquor treatment plant for the		

Name	Installation schedule 1 references	Description of the installation activity	Description of waste operations	Proposed changes document reference
	biological treatment plant >50tpd	treatment of dewatering liquors and high ammonia imported tanker wastes		
Alfreton STW Import permit			Import of cess, septic tank, portaloo and similar sewage derived wastes to the inlet for treatment via the UWWTD route	

2c Consolidating (combining) or updating existing permits

Yes

2c1 Do you want to have a modern style permit?

Yes

2c2 Identify all the permits you want to consolidate (combine)

See Table 2 below

Table C2-2

Table 2 – Permit Numbers
EPR/ GP3690CH (Formerly EAWML43529)

2d Treating batteries

2d1 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.

2f Low impact installations

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

No, this application is not for a low impact installation.

3 Your ability as an operator

3a Relevant offences

Table C2-3 – relevant offences

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).
£1,558,536	Prosecution	Dec 21	Worcestershire, England	Severn Trent Water Ltd	<p>Sentenced for four breaches of the Regulations for four cases.</p> <p>Sewage was discharged contrary to Regulation 38 (2) of the Environmental Permitting (England and Wales) Regulations 2016. (Blackminster)</p> <p>Breach of a limit contrary to regulation 38(2) Environmental Permitting (England and Wales) Regulations 2016. (Bromsgrove, Stoke Prior, Priest Bridge)</p>

3b Technical ability

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

Please see the appended CMS certificate, which has a scope including waste storage and treatment. Severn Trent Water are under contract with the certification body to increase the scope of the CMS to include the additional activities at the Alfreton site.

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 taken 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

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

3d Management systems (all)

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? What management system will you provide for your regulated facility? Please make sure you send us a summary of your management system with your application

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 ISO 14001:2015 for its Environmental Management System in August 2018, having held certification to previous versions of this standard continuously since 2011. 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 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 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.

Site Operational Control

Procedures are in place to identify and control environmental issues arising from Severn Trent Water operational and other 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 site 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 and being issued a work authorisation.

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 and there is an alarms process managed by a central team that flags anything outside of the set parameters for that process.

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;
- 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, or earlier, including routine inspections. 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.

Contingency Plans; Accident Prevention and Management Plans

All operational sites have accident prevention and management plans, developed to reflect the site specific operational risk and control measures. Plans take into account the structures and design of individual sites, including their environmental setting and location. Where appropriate, these include contingency plans for how imports and exports are to be handled during any period of operational disruption, including details of the closest alternative sites for these substances. Full contingency plans are limited by the nature of the sewerage infrastructure, as incoming UWWTD materials delivered by sewer cannot be diverted due to capacity and practicality issues.

Plans for individual sites are currently being reviewed to ensure that they fully comply with current BAT and Environment Agency guidance, with the aim of having these plans up to date by July 2022.

All contingency plans fit within our centralized Standard for incident management, which incorporates a Bronze, Silver and Gold response level, ensuring the required levels of management are involved in the response. Once

the incident is raised, it is managed by the central Network Control Team to maintain structure to the decisions, actions and records throughout.

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.

Record Keeping

Each site keeps electronic records of operational and environmental monitoring, as required within the management system, to comply with the requirements of OFWAT and the Environment Agency, including any monitoring data required for environmental permit compliance. All information required for the permit is kept for the required retention time, and this information is checked through EMS internal and external audits.

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 initially identified by role, and managed through Severn Trent's Academy system. Additional individual development opportunities are identified by the employee's immediate supervisor or line manager.

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.

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 Advisors and relevant Departments are responsible for rolling out the Basic Environmental Awareness, Permit competence training, and job specific training.

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

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 UKAS accredited requirements of the EU Skills Standard. The CMS is subject to management review at least annually. All appointed Technically Competent Persons (TCPs) undergo EMS awareness training and CMS Permit Competence training. These skills appear on employees SAP training records, and they are required to re-take training every 2 years. SAP automatically sends out a reminder to the individual and their line manager when the training is due to be renewed. 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, and subject to performance reviews.

The contractor 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. The Schedule 5 procedure ensures required notification to the environmental regulator where applicable.

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.

Climate Change

As part of its management program, including reviews associated with the AMP process (asset management plan, part of the OFWAT price review process) regular assessments are undertaken of works for the impacts of climate change including consideration of potential increased rainfall. Operational sites have been reviewed for flood resilience and energy management, and these findings are subject to periodic review and updating.

Communication

There are regular meetings held on site to discuss all aspects of the treatment works and performance against targets; these are generally called "Comm Cells". These meetings include the operation and performance of the installation and due to a standardized structure, allow issues direct line of sight escalation up to senior management and back again. Other communication methods to promote environmental management issues and continual improvement include: 'Lessons Learnt' bulletins, 'One Supply Chain (OSC) portal forums and compliance audits.

Site Closure

Where new plant, structures and equipment are planned for a site, consideration is given in the design phase, including engineering specifications, for the long term maintenance of that asset. This includes the eventual cleaning and decommissioning of the asset. Due to the underlying sewerage infrastructure, there is no site wide closure plan, as Severn Trent does not envision closing any full works.

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.

Discharges into this wider sewage treatment works are shown on the site emissions plan.

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 1999, 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 – Installation Boundary and Air Emission Points Plan

Figure 3 – Site Drainage Plan

Figure 4 – Process Flow Diagram

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

Yes. See Appendix E for the site report for the extra land. Although the site has an old waste management licence, the permit boundary within the plans relates to a number of offloading points only.

5c Provide a non- technical summary of your application

Please see Section 1.1 in this document.

5d Risk of fire from sites storing combustible waste

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 relocated 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.

An environmental screening assessment is provided in Table C2-5. To inform the screening assessment, a review of the sensitivity of the site setting has been undertaken.

Data taken from the MAGIC.gov.uk website, accessed 28th January 2022 is presented in Table C2-4 below. For habitat sites, the relevant distances for consideration are: international designations (SAC, MPA, SPA and RAMSAR - 10km); national designations (SSSI – 2km), LNRs (2km) and areas of ancient woodland habitat (2km). An environmental assessment provided by the EA details all Local Wildlife sites within 2km of the site. This assessment was conducted on 2nd February 2022.

Table C2-4 – Proximity of nature conservation sites

Site Name	Designation	Distance	Direction
Pond Wood, Alfreton	Local Wildlife Site (LWS)	610m	West

Site Name	Designation	Distance	Direction
Alfreton Parkway Railway Land Carnfield Hill	LWS	840m	East
Alfreton Park	LWS	1,100m	South West
Normanton Brook Marsh Area Tibshelf Sidings	LWS	1,150m	North East
Carnfield Wood	Ancient Woodland	1,200m	South East
Carnfield Wood and Outseats, Alfreton Tunnels	LWS	1,200m	South East
North Plantation	LWS	1,200m	East
Blackwell Triangle	LWS	1,250m	North East
Meadow Farm	LWS	1,400m	North
Blackwell Junction Embankment Meadow	LWS	1,500m	North East

There are nine Local Woodland sites and one area of ancient woodland within 2km of the site. Carnfield Wood ancient woodland is 1.2km south east and also forms part of a local wildlife site – Carnfield Wood and Outseats Alfreton Tunnels. The closest ecologically sensitive areas are Pond Wood, Alfreton and Alfreton Parkway Railway Land Carnfield Hill, which are 610m west and 840m east respectively. The other seven local wildlife sites lie within 1,100m and 1,500m south east to north east of the site.

There are no LNRs, NNRs or SSSIs within 2km of the site and there are no SACs, SPAs, MPAs or Ramsar Sites within 10km.

The whole of the sewage treatment works site sits within Flood Zone 1, that is, it has a flood risk of less than 1:1000 per annum. The Alfreton Beck runs along the northern boundary of the site and sits mainly within Flood Zone 3, with a small buffer in Flood Zone 2. This means most of the Brook has a flood risk of 1:100 per annum or higher, with some areas with a flood risk between 1:100 and 1:1000 per annum. The site does not sit within a groundwater source protection zone (SPZ).

The site is located directly adjacent to the South Normanton Air Quality Management Area (AQMA), Barlborough AQMA no.1 and Barlborough AQMA No. 2 declared by Bolsover District Council for Annual Mean Nitrogen dioxide (NO₂).

Table C2-5 Environmental 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 in a semi-rural setting on the outskirts of Alfreton. The nearest industrial and commercial properties lie to the South and South	The wastes handled at the site are primarily liquids and sludges, along with 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	X

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
	<p>East of the site perimeter (between 50m and 600m). The nearest residential properties to the site are situated in Alfreton, approximately 250m south of the installation. An allotment site lies between the residential properties and the site, 125m south of the site. A patch of trees provides screening between the allotments and the site boundary.</p> <p>The nearest school to the site is located 650m to the South East.</p> <p>A trail comes away from the road leading to the main entrance to the North of the site which runs along the North of the site perimeter, down the East perimeter to give access to the agricultural fields to the East.</p> <p>Ecological Receptors: There is one site of Ancient Woodland (Carnfield Woodland) which is 1.2km South East of the site. There are no LNRs, NNRs or SSSIs within 2km or SPAs, MPAs, SACs or Ramsar Sites within 10km of the site.</p>	<p>suitable contractor is called in as soon as practicable.</p>	
<p>Dust and bioaerosols</p>	<p>Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds, within 250m of source (cake pad)</p> <p>For human health and ecological receptors, see notes for Litter above.</p> <p>The impact of dust on human health will depend on the distance and wind direction.</p>	<p>The wastes handled at the site are liquids, sewage sludges and sewage cake, along with UWWTD derived material delivered by sewer.</p> <p>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.</p> <p>Produce sewage cake has sufficient moisture content to ensure it does not give rise to dust and is located on the eastern side of the site, away from sensitive receptors.</p> <p>Severn Trent has undertaken bioaerosol monitoring at multiple sites and found that there are no emissions. There are residential properties to the South which are approximately 450m from the cake pad. The allotments are approximately 275m from the cake pad.</p>	<p>X</p>
<p>Assessment of point source emissions to air</p>	<p>Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields</p>	<p>The installation has a biogas fuelled CHP engine and three biogas boilers, for which ADMS modelling indicates emissions are</p>	<p>X</p>

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
Emissions deposited from air to land	<p>and playgrounds. Industrial estates and rail stations.</p> <p>For human health and ecological receptors, see notes for Amenity issues above.</p> <p>The impact of emissions from air on human health will depend on the distance and wind direction.</p>	<p>unlikely to result in unacceptable impacts on air quality.</p> <p>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 are offline.</p> <p>Fugitive emissions to air are assessed separately.</p>	
Assessment of point source and fugitive emissions to water	<p>The Alfreton Brook is located approximately 50m North of the boundary of the wider sewage works. All the works is in flood zone 1 indicating a low annual probability of flooding (<1:1000). However, the area immediately around the Alfreton Brook is in flood zone 2 or flood zone 3, indicating a medium to high annual probability of flooding (between 1:1000 to 1:100 or >1:100).</p> <p>Surface water drainage within the site drains to the inlet of the adjacent sewage treatment works for full treatment prior to discharge.</p>	<p>The main product of the process is a sewage cake, which is stored within flood zone 1, on a concrete pad equipped with drainage.</p> <p>Other aqueous discharges generated by the process are limited (comprising dewatering liquors, biogas condensate, and surface water run off). These sources are discharged to the on-site drainage system where they are transferred to the main sewage works inlet.</p> <p>The primary cake pad is located approximately 50m from the Brook and is directly adjacent to a higher flood risk zone. Tankers who access the cake pad utilise the wheel wash, however the tankers have to use the bridge over the Brook to leave the site. Potential source of run-off of cake to the Brook.</p> <p>Due to the nature and small quantity of these emissions no further assessment of point source emissions is deemed necessary.</p>	<p>X</p>
Assessment of odour	<p>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.</p> <p>For human health and ecological receptors, see notes for Amenity issues above.</p> <p>The impact of emissions from odour on human receptors will depend on the distance and wind direction.</p>	<p>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.</p> <p>There are two odour control units at the site.</p>	<p>X</p>
Energy	Global atmosphere (direct and indirect emissions)	Biogas generated by the facility is utilised to generate electrical power for the site; and exported to	<p>X</p>

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
		<p>the grid; thus increasing renewable energy supplies. Thus reducing the need to utilise non-renewable energy supplies.</p> <p>Waste heat from the CHP engine is utilised to control primary digester temperature when required and reduce demand on the auxiliary boilers.</p>	
<p>Land and disposal of waste to other processes</p>	<p>Rivers and streams – see Assessment of point source and fugitive emissions to water above.</p> <p>Drainage systems/sewers.</p> <p>The site is not located within a Groundwater source protection zone (SPZ). Aquifers are classified as secondary A (solid deposits) and secondary A and unproductive (superficial deposits).</p>	<p>All waste streams disposed of off-site will continue to be to appropriately permitted facilities.</p>	<p>X</p>
<p>Noise and vibration</p>	<p>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.</p> <p>The site is located in a semi-rural setting on the outskirts of Alfreton. The nearest industrial and commercial properties lie to the South and South East of the site perimeter (between 50m and 600m). The nearest residential properties to the site are situated in Alfreton, approximately 250m south of the site.</p> <p>The nearest school to the site is located 650m to the South East.</p> <p>A trail comes away from the road leading to the main entrance to the North of the site which runs along the North of the site perimeter, down the East perimeter to give access to the agricultural fields to the East.</p> <p>Ecological Receptors: There is one site of Ancient Woodland (Carnfield Woodland) which is 1.2km South East of the site and nine local wildlife sites between 610m and 1,500m from the site. There are no LNRs, NNRs or SSSIs within 2km or SPAs, MPAs, SACs or Ramsar Sites within 10km of the site.</p>	<p>Site design has been chosen to minimise the impact of noise on offsite receptors through building orientation, finishes and location of openings.</p> <p>Noise from plant and equipment will be minimised through purchasing decisions and a robust preventative maintenance programme.</p>	<p>X</p>

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
Other issues (including protected species)	Not Applicable	<p>A protected species, water vole, has been identified within 500m of the facility. However, there are no direct discharges to land or water from the facility.</p> <p>There are no other site-specific environmental risks identified.</p>	X
Other issues (including protected species) Climate Change	Not Applicable	<p>A protected species, water vole, has been identified within 500m of the facility. However, there are no direct discharges to land or water from the facility.</p> <p>There are no other site-specific environmental risks identified.</p>	X
	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.	<p>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. The LTP may not work as effectively at an elevated temperature, but this can be reduced through shading or process redesign.</p> <p>If less biogas is used, the site may require a new gas engine that is appropriately sized to utilise additional biogas. However, the CHP engine will need to be replaced prior to 2050 when it reaches the end of its operational lifespans.</p>	X

3.2 Form C3

1 What activities are you applying to vary?

Table C3-1a

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)
Alfreton 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 and recovery of by-products (digestate).	448.5m ³ per day (input) 3,139m 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 2 (excluding temporary storage, pending collection, on the site where the waste is produced)	None	448.5 wet tonnes per day
Alfreton STW Bioresources	S5.4A1(a)(i) Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day (or 100 tonnes per day if the only waste treatment activity	From receipt of dewatering liquors for treatment through to the release of treated liquor back to the work inlet	448.5m ³ per day (input) 3,139m ³ per week (input)	D 8 Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the	None	448.5 wet tonnes per day

	<p>is anaerobic digestion) involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC concerning urban waste-water treatment(a)— (i) biological treatment;</p>			<p>operations numbered D 1 to D 12 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)</p>		
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Name of DAA	Description of the DAA
AR2	Import of sewage sludge, cess and septic tank wastes, and digested sludge;
AR3	Blending of imported wastes prior to treatment
AR4	Storage of digestate prior to dewatering
AR5	Dewatering of digested sewage sludge
AR6	Transfer of centrate back to the head of the sewage treatment works
AR7	Storage of dewatered sewage cake prior to offsite recovery
AR8	Storage of biogas
AR9	Combustion of biogas in an MCPD and Specified Generator (SG) compliant biogas CHP unit and boiler units
AR10	Emergency flare
AR11	Storage of raw materials
Total treatment capacity	5,382 m ³
Total cakepad capacity	6,498m ³
Annual throughput (tonnes each year)	163,702.5 wet tonnes per year

Waste Activities

Name of Waste Activity	Annex I (D codes) and Annex II (R codes) and descriptions	Description of Waste Activity
AR12 Direct transfer and blending of waste into head of works and LTP.	D13: Blending or mixing prior to submission to any of the operations numbered D1 to D12. D15: Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where the waste is produced)	Import of tankered waste to the head of the works for direct treatment through the UWWTD route

Types of waste accepted

Table C3-1b – Wastes for waste activity ONLY

Waste code	Waste code Description of the waste
01 05 04	freshwater drilling muds and wastes
01 05 07	barite-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
01 05 08	chloride-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
02 02 01	sludges from washing and cleaning
02 02 02	animal tissue waste
02 02 03	materials unsuitable for consumption or processing
02 02 04	sludges from on-site effluent treatment
02 03 01	sludges from washing, cleaning, peeling, centrifuging and separation
02 03 02	wastes from preserving agents
02 03 03	Wastes from solvent abstraction
02 03 04	materials unsuitable for consumption or processing
02 03 05	sludges from on-site effluent treatment
02 04 01	soil from cleaning and washing beet
02 04 02	off-specification calcium carbonate
02 04 03	sludges from on-site effluent treatment
02 05 01	materials unsuitable for consumption or processing
02 05 02	sludges from on-site effluent treatment
02 06 01	materials unsuitable for consumption or processing
02 06 02	wastes from preserving agents
02 06 03	sludges from on-site effluent treatment
02 07 01	wastes from washing, cleaning and mechanical reduction of raw materials
02 07 02	wastes from spirits distillation
02 07 03	wastes from chemical treatment
02 07 04	materials unsuitable for consumption or processing
02 07 05	sludges from on-site effluent treatment
03 03 02	green liquor sludge (from recovery of cooking liquor)
03 03 05	de-inking sludges from paper recycling
03 03 07	mechanically separated rejects from pulping of waste paper and cardboard
03 03 11	sludges from on-site effluent treatment other than those mentioned in 03 03 10
04 01 01	fleshings and lime split wastes
04 01 05	tanning liquor free of chromium

Waste code	Waste code Description of the waste
04 01 07	sludges, in particular from on-site effluent treatment free of chromium
04 01 09	wastes from dressing and finishing
04 02 10	organic matter from natural products (for example grease, wax)
04 02 15	wastes from finishing other than those mentioned in 14 02 14
04 02 17	dye-stuffs and pigments other than those mentioned in 04 02 16
04 02 20	sludges from on-site effluent treatment other than those mentioned in 04 02 19
05 01 10	sludges from on-site effluent treatment other than those mentioned in 05 01 09
06 05 03	sludges from on-site effluent treatment other than those mentioned on 06 05 02
07 01 12	sludges from on-site effluent treatment other than those mentioned in 07 01 11
07 02 12	sludges from on-site effluent treatment other than those mentioned on 07 02 11
08 01 16	aqueous sludges containing paint or varnish other than those mentioned in 08 01 15
08 01 18	wastes from paint or varnish removal other than those mentioned in 08 01 17
08 01 20	aqueous suspensions containing paint or varnish other than those mentioned in 08 01 19
08 03 07	aqueous sludges containing ink
08 03 08	aqueous liquid waste containing ink
08 03 13	waste ink other than those mentioned in 08 03 12
08 03 15	ink sludges other than those mentioned in 08 03 14
08 04 14	aqueous sludges containing adhesives or sealants other than those mentioned in 08 04 13
08 04 16	aqueous liquid waste containing adhesives or sealants other than those mentioned in 08 04 15
11 01 12	aqueous rinsing liquids other than those mentioned in 11 01 11
16 01 15	antifreeze fluids other than those mentioned in 16 01 14
16 03 06	organic wastes other than those mentioned in 16 03 05
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01
16 10 04	aqueous concentrates other than those mentioned in 16 10 03
19 02 06	Sludge/ effluents from physicochemical treatment other than those mentioned in 19 02 05
19 05 03	Off-specification liquid compost that arise from treatment of municipal, vegetable waste types
19 06 03	liquor from anaerobic treatment of municipal waste
19 06 04	digestate from anaerobic treatment of source segregated biodegradable waste
19 06 05	liquor from anaerobic treatment of animal and vegetable waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 07 03	landfill leachate other than those mentioned in 19 07 02
19 08 01	Screenings
19 08 02	waste from de-sanding
19 08 05	Sludges from treatment of urban waste water
19 08 09	grease and oil mixture from oil/water separation containing only edible oil and fats

Waste code	Waste code Description of the waste
19 08 12	sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11
19 08 14	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13
19 09 02	Sludges from water clarification
19 09 03	Sludges from decarbonation
19 09 06	Solutions and sludges from regeneration of ion exchangers
19 12 12	Aqueous liquid wastes and aqueous concentrates from groundwater remediation other than those mentioned in 19 13 07
19 13 06	sludges from groundwater remediation other than those mentioned on 19 13 05
19 13 08	aqueous liquid wastes and aqueous concentrates from groundwater remediation other than those mentioned in 19 13 07
20 01 08	biodegradable kitchen and canteen waste
20 01 25	edible oil and fat
20 01 30	detergents other than those mentioned in 20 01 29
20 02 01	biodegradable waste – liquid wastes and mixed concentrates
20 03 01	mixed municipal waste
20 03 02	waste from markets
20 03 03	street-cleaning residues
20 03 04	Septic tank sludge
20 03 06	Waste from sewage cleaning

Table C3-1b – Waste accepted for installation ONLY

Waste Code	Description of Waste
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste (sewage sludge only)
19 08 05	Sludges from treatment of urban waste water
20 03 04	Septic tank sludge
20 03 06	Waste from sewage cleaning

Table C3-1c – Wastes for import activity to Liquor Treatment Plant ONLY

Waste code	Description of the waste
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01
16 10 04	aqueous concentrates other than those mentioned in 16 10 03
19 08 05	Sludges from treatment of urban waste water

Waste code	Description of the waste
19 08 12	sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11
19 08 14	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13
19 08 99	Centrate liquor only
19 09 02	Sludges from water clarification
19 09 03	Sludges from decarbonation
19 09 06	Solutions and sludges from regeneration of ion exchangers
20 03 04	Septic tank sludge
20 03 06	Waste from sewage cleaning
20 03 99	Cesspool waste and other sewage sludge only

2 Point source emissions to air, water and land

Table C3-2 Emissions to Air

Table C3-2 Emissions to Air

Emission point reference and location	Source	Parameter	Concentration	Units
A1 SK 41290 56653	CHP engine 1 (biogas only)	NOx	500	mg/m ³
		Sulphur Dioxide	350	mg/m ³
		Carbon Monoxide	1400	mg/m ³
A2 SK 41270 56643	Auxiliary Boiler 1	No limit set	-	-
A3 SK 41271 56641	Auxiliary Boiler 2	No limit set	-	-
A4 SK 41272 56640	Auxiliary Boiler 3	No limit set	-	-
A5 SK 41214 56648	Emergency Flare (note 1)	NOx	150	mg/m ³
A6 SK 41251 56645	Gas storage pressure relief valves	No limit set	-	-

Emission point reference and location	Source	Parameter	Concentration	Units
A7 SK 41259 56670	Digester storage tanks pressure relief valve	No limit set	-	-
A8 SK 41277 56678	Digester storage tanks pressure relief valve	No limit set	-	-
A9 SK 41252 56614	Odour Control Unit (imported sludge)	No limit set	-	-
A10 SK 41269 56602	Odour Control Unit (sludge transfer)	No limit set		
A11 SK 41298 56598	Odour Control Unit (sludge tanks)	No limit set	-	-

Note 1: Monitoring to be undertaken in the event the emergency 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.

There are three Odour Control Units at the site.

Emission point reference and location	Source	Parameter	Concentration	Units
T1 SK 41286 56789	Return Liquors from site drainage	No limit set	-	-
T2 SK 41239 56622	Return liquors from pumping station	No limit set	-	-
T3 SK 41436 56598	Offloading point for waste to the works inlet for treatment in the UWWTD stream	No limit set		
T4 SK 41269 56621	Offloading point for sludge to the digestion process	No limit set		
T5 SK 41314 56755	Offloading point to the LTP	No limit set		

3 Operating techniques

3a Technical standards

Table C3-3 Technical standards

Schedule 1 activity or DAA	Best available technique	Document reference
S5.4A1(b)(i) S5.4A1(a)(i)	Biological waste treatment: appropriate measures for permitted facilities Updated 6 th July 2023	Biological waste treatment: appropriate measures for permitted facilities - Guidance - GOV.UK (www.gov.uk)

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 site?

Yes – EWC codes for the imports to the inlet and the original SCR remain valid.

3b General requirements

Table C3-4 General requirements

Name of the installation: Alfreton 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

If the TGN or H1 assessment shows that emissions of substances not controlled by emission limits are an important issue, send us your plan for managing them.

Although screened out of the detailed Risk Assessment (Question C2 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. An assessment of fugitive emissions has been undertaken using the following methodology. The risk assessment is presented in Tables C3-3b(i) to (iv).

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
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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).	<p>Impact is low or a minor, short-term nuisance.</p> <p>Minor release to a non-sensitive receptor or pollution of water course.</p> <p>Non-permanent health effects to human health (preventable by appropriate PPE).</p> <p>Minor surface damage to buildings; structures; services; or the environment which can be repaired immediately.</p>	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).	<p>Impact is noticeable in the short to medium-term.</p> <p>Large release impacting on the receiving media killing flora and fauna and requires remediation.</p> <p>Nuisance causing non-permanent health effects to human health.</p> <p>Damage to buildings; structures; services; or the environment preventing short-term use and/or requiring repair.</p>	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.	<p>Impact is significant, wide-ranging and long-lasting effect.</p> <p>Has a chronic or acute impact on human health.</p> <p>Very large release that has a major impact on flora and fauna which may be very difficult to remediate.</p> <p>Significant damage to buildings; structures; services; or the environment which prevents use long-term and may require complete replacement.</p> <p>May cause a long-term impact or contribute towards a global issue due to releases of greenhouse gases.</p>	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 C2 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 NO _x , SO ₂ , CO ₂ and VOCs	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors	High	Low	Medium	<p>Activities are managed and operated in accordance with the site management system (including inspection and maintenance of equipment, including engine management systems), point source emissions to air (CHP engine, boilers and emergency flare stack) have emission limits for NO_x, CO₂, SO₂.</p> <p>Flare stack height approx. 5m, CHP stack approx. 3.5m and boiler flue approx. 10m.</p>	Low
Gas transfer systems, gas storage tank, gas engines, flares or PRV 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	<p>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.</p> <p>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.</p>	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						<p>Personnel on site wear portable gas detectors in order to alert staff to presence of biogas.</p> <p>A waste biogas burner (emergency flare) is utilised for the safe disposal of surplus biogas in the event of plant breakdown, or a surplus of biogas above the level that can be safely stored or utilised. Use of emergency flare is recorded.</p> <p>PRVs are in place on the biogas holder to be operated in the event of failure of the emergency flare to prevent overpressurisation and catastrophic failure.</p>	
<p>Catastrophic loss of biogas emissions from gas transfer systems, gas storage tank, gas engines, flares or PRVs</p>	<p>Abnormal</p>	<p>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</p>	<p>Low</p>	<p>High</p>	<p>Medium</p>	<p>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.</p> <p>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.</p> <p>A waste biogas burner (emergency flare) is utilised for the safe disposal of surplus biogas in the event of plant breakdown, or a surplus of</p>	<p>Medium</p>

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						<p>biogas above the level that can be safely stored or utilised. Use of emergency flare is recorded.</p> <p>PRVs are in place on the biogas holder to be operated in the event of failure of the emergency flare to prevent over pressurisation and catastrophic failure.</p>	
<p>Combustion of biogas within CHP engine and emergency flare. Combustion of biogas or natural gas within boilers</p>	Normal	<p>Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Global warming potential</p>	High	Low	Medium	<p>Combustion plant is regularly maintained and appropriately sized to manage volumes of biogas.</p> <p>Combustion plant operates within permitted ELVs subject to routine monitoring against permit compliance.</p> <p>The CHP engine is located away from the nearest residential properties, which are 360m to the South; the nearest commercial buildings (crane yard) are located approximately 150m to the South. The emergency flare is located in a similar distance by the Western boundary of the site.</p>	Low
<p>Release of bioaerosols and dust</p>	Normal	<p>Emissions to air and dispersion leading to inhalation by local human and animal receptors. Odour impact of bioaerosols. Nuisance impact of dust.</p>	Medium	Low	Medium	<p>The risk of bioaerosol and dust is largely minimised by storing the digested sludge cake away from sensitive receptors, in the Northern area of the site. This is approximately 470m from sensitive residential receptors (namely properties at the settlement of Alfreton) and 275m from the allotments. The distance to</p>	Medium

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						<p>commercial buildings from the pad is approximately. In all cases, this exceeds the 250m threshold in the M9 guidance document.</p> <p>Cake is stored on an engineered hardstanding cake pad which is connected to the site drainage system. Walls around the pads help to reduce wind impact on the cake. The cake pad is not situated in close proximity to sensitive designated ecological sites.</p> <p>The cake pad is in close proximity (60m) to the Alfreton Brook. Access to the cake pad is on the Eastern side of the pad, which leads directly to the access point for the site, which includes a bridge over the Brook. Samples are taken before the final effluent is discharged to the Brook so would not capture contamination from digested cake.</p> <p>Roads are made from concrete/asphalt and not prone to the generation of dust.</p>	
<p>Release of bioaerosols and dust from spillages</p>	<p>Abnormal</p>	<p>Emissions to air and dispersion leading to inhalation by local human and animal receptors with potential harm to health. Odour impact of bioaerosols. Nuisance impact of dust.</p>	<p>Medium</p>	<p>Low</p>	<p>Medium</p>	<p>The risk of bioaerosol and dust is largely minimised by storing the digested sludge cake away from sensitive receptors, in the Northern area of the site. This is approximately 460m and 540m from sensitive residential receptors (namely properties at the settlement of Alfreton and Alfreton Knoll respectively) and 275m for the allotments. It is also approximately 300m from the nearest</p>	<p>Medium</p>

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						<p>commercial buildings. These distances exceed the 250m distance specified in the M9 guidance document.</p> <p>Cake is stored on an engineered hardstanding cake pad which is connected to the site drainage system. Walls around the pads help to reduce wind impact on the cake. The cake pad is not situated in close proximity to sensitive designated ecological sites.</p> <p>The cake pad is in close proximity (60m) to the Alfreton Brook. Access to the cake pad is on the Eastern side of the pad, which leads directly to the access point for the site, which includes a bridge over the Brook. Samples are taken before the final effluent is discharged to the Brook so would not capture contamination from digested cake.</p> <p>Severn Trent carried out a monitoring exercise at 8 sites and Upwind and downwind locations results remained below the industry standard threshold values of 500cfu/m³ for Aspergillus Fumigatus. Upwind and downwind locations results remained below the industry standard threshold values of 1000cfu/m³ for Total Bacteria. Roads are made from concrete/asphalt and not prone to the generation of dust.</p>	

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						Staff responsible for site housekeeping and cleaning of spillages in a timely manner.	
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 Alfreton Brook on the Northern perimeter of the site. 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	Low	Medium	Low	The site is not located within a Groundwater Source Protection Zone (SPZ). 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.				<p>maintenance programme including regular visual inspection for cracks or weeping.</p> <p>Leak detection systems, visual checks during regular day-to-day operations and scheduled preventative maintenance of equipment, such as pumps, pipes, joins etc</p> <p>Biogas condensate discharged back to the works inlet through site drainage system.</p> <p>Spill kits available on site.</p> <p>There are no point source emissions to water with drainage system pumping back to works inlet.</p>	
Generation of solid waste resulting in litter	Normal	Releases of litter to the environment. Visual nuisance and local loss of amenity	Low	Low	Low	<p>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.</p> <p>Waste is stored securely for collection by appropriately licensed approved contractors.</p> <p>Litter picking activities are completed as required.</p>	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
H₂S/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	<p>Biogas will principally be generated in the two primary digestion tanks which are covered with fixed roofs.</p> <p>The nearest residential properties approximately 380m to the South from the digesters and the nearest commercial buildings are located over 170m to the South of the digesters.</p> <p>Small amounts of biogas may also be generated within digestate storage tanks (secondary digestors) which are located further from human receptors, over 390m from residential properties and over 210m from commercial buildings.</p> <p>H₂S production is controlled through the digestion process which can be manually overridden if required.</p>	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
<p>Loss of containment from biogas holder and biogas pipework</p>	<p>Abnormal</p>	<p>Emissions to air and dispersion leading to inhalation by local human receptors</p> <p>Loss of amenity from odour nuisance</p>	<p>Low</p>	<p>Medium</p>	<p>Low</p>	<p>Biogas is principally stored within a floating roof gas holder which is suitably sized to manage biogas generation.</p> <p>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.</p> <p>Personnel on site wear portable gas detectors in order to alert staff to presence of biogas.</p> <p>Physical protection measures in place for biogas holder, including kerbing and pipework is guarded.</p> <p>PRVs available to safely manage pressures within the biogas holder and prevent under or over pressurization.</p>	<p>Low</p>
<p>Activation of biogas PRV</p>	<p>Abnormal</p>	<p>Emissions to air and dispersion leading to inhalation by local human receptors</p> <p>Loss of amenity from odour nuisance</p>	<p>Low</p>	<p>Low</p>	<p>Low</p>	<p>PRVs are only activated in emergency situations to maintain safety within the biogas system and are re-seated/repared promptly to minimize biogas emissions.</p> <p>PRVs subject to monitoring via SCADA and visual checks by site personnel.</p>	<p>Low</p>

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						<p>Biogas is principally stored within the site gas holder which is suitably sized to manage biogas generation and act as buffer storage for biogas. The site has a CHP engine of 1.6MWth, three boilers (3 x 0.55MWth, total of 1.65MWth thermal input) and one flare which are used in order of preference to maximise recovery of energy.</p> <p>The 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.</p> <p>CHP engine and boilers are located away from the nearest residential properties which are 360m to the South; the nearest commercial buildings (crane yard) are located approximately 160m South. The emergency flare is located at a similar distance on the Western boundary.</p>	
<p>H₂S/biogas emitted when biogas cannot be combusted in engine, boilers or flare</p>	<p>Abnormal</p>	<p>Emissions to air and dispersion leading to inhalation by local human receptors</p> <p>Loss of amenity from odour nuisance</p>	<p>Low</p>	<p>Low</p>	<p>Low</p>	<p>Biogas is principally stored within the floating roof gas holder which is suitably sized to manage biogas generation and act as buffer storage when biogas cannot be combusted. The site has a CHP engine, three boilers and one flare giving multiple outlets for biogas.</p> <p>CHP engine and boilers are located away from the nearest residential properties which are</p>	<p>Low</p>

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						360m to the South; the nearest commercial buildings (crane yard) are located approximately 160m South. The 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.	
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	High	Low	Medium	Digested sludge cake is stored on an engineered hardstanding cake pad which is connected to the site drainage system at the site away from sensitive receptors and is inherently low odour material. Should any odorous sludge cake be produced, this will be subject to process checks undertaken to identify root cause of production and removed from site expediently.	Low
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.

Table C3-3b(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	<p>The CHP engine is acoustically baffled, self-contained and designed for external applications therefore noise emissions are already low.</p> <p>CHP engine and boilers are located away from the nearest residential properties which are 360m to the South; the nearest commercial buildings (crane yard) are located approximately 160m South. Good maintenance of plant to ensure that excessive noise levels are not generated.</p> <p>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.</p>	Low
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	<p>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 to the Site are situated 240m to the South at Alfreton and the nearest commercial</p>	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						<p>properties are situated immediately South of the site perimeter.</p> <p>Good maintenance of fans to ensure that excessive noise levels are not generated. Where repair or replacement is required, this will be completed promptly.</p>	
Operation of site vehicles	Normal	<p>Generation of noise with air transportation, causing loss of amenity to local human receptors.</p> <p>Generation of vibration with ground transmission, causing loss of amenity to local human receptors.</p>	High	Medium	High	<p>Vehicle movements across the site subject to speed limit and one-way system to reduce generation of noise.</p> <p>Reversing obligations minimised by site layout.</p> <p>Tanker deliveries limited to daytime only.</p>	Low
Operation of emergency flare	Abnormal	Generation of noise with air transportation, causing loss of amenity to local human receptors.	High	Low	Medium	<p>Use of the emergency flares is minimized by prioritizing use of the CHP and boilers with use of the flare recorded.</p> <p>The emergency flare is located more centrally at the site and approximately 380m from nearest residential property and 200m from the nearest commercial buildings.</p>	Low

Table C3-3b (iv) - Environmental Risk Assessment and Accident Management Plan

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
<p>Major fire and/or explosion causing the release of polluting materials to air, water or land.</p>	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population</p> <p>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.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p>	<p>Low</p>	<p>High</p>	<p>Medium</p>	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Management systems requires DSEAR assessment which is adhered to by site operations.</p> <p>Designated ATEX zones on site and lightning protection system in place around biogas holder. Fire alarm systems installed and maintained.</p> <p>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.</p> <p>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.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively.</p> <p>Smoking only permitted in designated areas of site.</p>	<p>Low</p>
<p>Minor fire causing the release of polluting materials to air, water or land</p>	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory</p>	<p>Low</p>	<p>Medium</p>	<p>Low</p>	<p>Follow site Incident Response Plan and inform relevant authorities.</p>	<p>Low</p>

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	<p>irritation, illness and nuisance to local population</p> <p>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.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p>				<p>Management systems requires DSEAR assessment which is adhered to by site operations.</p> <p>Designated ATEX zones on site and lightning protection system in place around biogas holder. Fire alarm systems installed and maintained.</p> <p>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.</p> <p>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.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively.</p> <p>Smoking only permitted in designated areas of site.</p>	
<p>Failure to contain firefighting water</p>	<p>Emissions to ground and ground water of contaminated firefighting water entering soil and/or groundwater. Run-off from site to surface water courses.</p> <p>Harm to aquatic flora and fauna.</p>	<p>Low</p>	<p>Medium</p>	<p>Low</p>	<p>Likelihood of firefighting water being generated is low as the risk of fire is low.</p> <p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Spill kits provided around the site can be used to direct run-off towards site drainage. Site drainage</p>	<p>Low</p>

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	Chronic effect on water quality				<p>returns to works inlet providing containment and treatment process for fire water.</p> <p>Arrange for off-site tankering of firefighting water, if required.</p>	
Accidental explosion of biogas	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p> <p>Pollution of water or land</p>	Low	High	Medium	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Management systems requires DSEAR assessment which is adhered to by site operations.</p> <p>Designated ATEX zones on site and lightning protection system in place around biogas holder. Fire alarm systems installed and maintained.</p> <p>Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop gas flows, electric temperature sensor, pressure monitors, flame arrestors, etc. Lightning protection system installed.</p> <p>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.</p>	Low
Significant leak of biogas to atmosphere	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory	Low	High	Medium	Site assets are protected by physical means to prevent vehicle strike and exposed pipework is guarded.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	irritation, illness and nuisance to local population. Global warming potential of greenhouse gases.				Regular proactive and preventative maintenance and regular visual checks. PRVs are present to avoid over pressurisation of biogas system. Biogas detectors are in place between the two layers of biogas membranes which will raise the alarm should a leak of biogas be detected.	
Leaks of emission to air, but principally NOx.	Emissions to air and dispersion leading to harm to protected nature conservation sites – SSSIs, SAC and SPA. Harm to protected site through toxic contamination, nutrient enrichment, disturbance etc.	Low	Medium	Medium	The nearest designated nature conservation site is Carnfield Wood ancient woodland, which is situated approximately 1.2km South-East of the site. There are also nine local wildlife sites between 610m and 1.5km of the site. There are no LNRs or SSSIs within 2km or SACs, SPAs, MPAs or Ramsar sites within 10km of the site. 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.	Low
Spillage of raw materials during (e.g. diesel, polymer,) during use, transfer	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.	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.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
<p>and disposal operations.</p>	<p>Harm to aquatic flora and fauna. Chronic effect on water quality</p>				<p>In event of a spillage, follow site spillage response plan and inform relevant site personnel. COSHH data sheets available.</p> <p>Deliveries to site are made by approved suppliers. Use of raw materials is carried out by trained personnel or automatically controlled processes.</p> <p>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.</p> <p>Site drainage returns to works inlet providing treatment process for suitable materials, or arrange off-site tankering of waste, if required.</p>	
<p>Spillage of sludges (e.g. raw sludge, digested sludge) during processing and transfer operations e.g. tank overtopping, pipework leaks</p>	<p>Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.</p> <p>Harm to aquatic flora and fauna. Chronic effect on water quality</p>	<p>Low</p>	<p>Low</p>	<p>Low</p>	<p>Processing and transfer operations of waste materials is largely an automatic process controlled by the Process Controllers and parameters set within the SCADA system.</p> <p>Storage and digestion tanks are fitted with sensors to monitor levels within a tank and can inhibit additional pumping if high alarms activate.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively and minimise the risk of spillages.</p>	<p>Low</p>

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					<p>In event of a spillage, follow site spillage response plan and inform relevant site personnel and relevant authorities.</p> <p>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.</p>	
<p>Failure of sludge storage tanks / digester tanks</p>	<p>Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.</p> <p>Harm to aquatic flora and fauna.</p> <p>Chronic effect on water quality.</p>	<p>Low</p>	<p>High</p>	<p>Medium</p>	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Regular infrastructure inspections for tanks and pipework and planned preventive maintenance system in place. Regular visual inspections for tanks and pipework and reactive maintenance.</p> <p>In-line flow monitoring in key locations and tank level monitoring would identify losses and enable a quick response.</p> <p>Tanks are found on unmade ground but are 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.</p>	<p>Medium</p>

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
<p>All on-site hazards: machinery</p>	<p>Direct physical contact with human population and /or livestock after gaining unauthorised access to the installation.</p> <p>Bodily injury</p>	<p>Low</p>	<p>High</p>	<p>Medium</p>	<p>Direct physical contact is minimised by activity being carried out within enclosed digesters.</p> <p>Site activities are managed and operated in accordance with a management system. Site physical security measures to prevent unauthorised access.</p> <p>Assets are protected by various physical means including fencing, kerbing and bollards to prevent vehicle strikes.</p> <p>Site has a one-way traffic management system to minimise the need to reverse. Use of banksmen as appropriate.</p> <p>Vehicles equipped with reversing alarms.</p>	<p>Low</p>
<p>Vandalism causing the release of polluting materials to air (smoke or fumes), water or land.</p>	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population</p> <p>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</p>	<p>Low</p>	<p>High</p>	<p>Medium</p>	<p>Unauthorised access is unlikely to happen and minimised by physical site security measures and effective management systems.</p> <p>Site has access controlled barrier entry for all vehicular access. Fence runs the perimeter of the site.</p> <p>Additional security fences around some assets and other assets are kept within locked containers or buildings. Warning signs are displayed.</p>	<p>Low</p>

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	<p>and chronic effect on water quality.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p>					
<p>Flooding from rivers, streams and groundwater</p>	<p>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.</p>	<p>Medium</p>	<p>Low</p>	<p>Low</p>	<p>The site is located within Flood Zone 1 indicating that it has a low probability of flooding. The Alfreton Brook is located in Flood Zone 3 with a small buffer area of Flood Zone 2.</p> <p>General wider works designed to minimise risk of localised works flooding due to storm surges.</p> <p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Take appropriate corrective and preventative actions to minimise environmental impact</p>	<p>Low</p>
<p>Flooding due to drain blockages and/or excessive rainfall causing localised on-site surface water flooding</p>	<p>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.</p>	<p>Medium</p>	<p>Low</p>	<p>Low</p>	<p>Site wide drainage system linked to main sewage works, which includes additional capacity in storm tanks within the works to manage additional flows.</p> <p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Take appropriate corrective and preventative actions to minimise environmental impact</p>	<p>Low</p>

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
<p>Loss of mains power leading to failure of pumps / control systems and possible leaks and escape of sludge</p>	<p>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.</p>	<p>Low</p>	<p>Medium</p>	<p>Low</p>	<p>Site CHP engine is able to supply electricity to the site using biogas supplies on site.</p> <p>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.</p> <p>Site wide drainage system linked to main sewage works in the event of a spillage.</p>	<p>Low</p>

3c –Types and amounts of raw materials

Table C3-5 Types and amounts of raw materials

Name of the installation					
Description of raw material and composition	Maximum storage amount	Annual throughput (tonnes per annum or as stated)	Description of the use of the raw material	Alternatives	Description of raw material and composition
Anti foam	2 IBCs (1000 liters each)	5 IBCs/year.	Added to primary digesters to reduce foaming, as required	Standard product used for this purpose within the industry	Anti foam
Fuel oil/Diesel/LFO	15,000 litres	<10,000 litres	Back-up fuel for use within boilers	No viable alternative. Used as a backup only.	Fuel oil/Diesel/LFO
Lubricating oils	2,500 litres	<4,000 litres	Equipment lubricant	None available	Lubricating oils
Glycol coolant	100 litres	<500 litres	CHP engine coolant	None available	Glycol coolant
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 countervalent pelleters.	None as unit designed to use this media for chemical scrubbing	Dry chemical scrubber material
AWT Biograded Rock	Not stored on site	Replaced as required	Biofilter used in the odour control unit	None available	AWT Biograded Rock
Water treatment chemicals	Not stored on site	Replaced as required	Water treatment for the boilers	None available	Water treatment chemicals
Biogas	1,500m ³	See 1.1 Biogas	Primary fuel for the CHP	Best available practice.	Biogas
Polymer	6 tonnes	<100 tonnes	Digested sludge thickening	None available	Polymer
Lime	Not stored on site	<10 tonnes/year	Pathogen control for sludge where kill level has not been achieved	None available	Lime
AdBlue	2,500 litres	Replaced as required		None available	AdBlue

Name of the installation					
Description of raw material and composition	Maximum storage amount	Annual throughput (tonnes per annum or as stated)	Description of the use of the raw material	Alternatives	Description of raw material and composition
Caustic Soda	15 tonnes	Replaced as required		None available	Caustic Soda
Ferric Sulphate	30 tonnes	Replaced as required	Phosphate/Struvite control	None available	Ferric Sulphate

4 Monitoring

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

The CHP engine air emission point A1 will be monitored in accordance with the requirements of MCPD.

Point A5 to be monitored in accordance with EA guidance in the event the flare is operational over 876 hours per year.

Emission points A2 – A4; A6 – A11 to be monitored in accordance with current EA guidance.

Transfer points T1 and T2 monitored in accordance with the requirements of the improvement condition.

Transfer points T3 – T5 are the offloading points for incoming wastes and do not require direct monitoring as this is undertaken as part of the waste pre-acceptance and acceptance checks at the site.

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?

No

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

N/A – ducting is 0.3m diameter

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 operational site with the combustion assets entering environmental permitting for the first time, sampling locations and sampling ports may not meet all of the requirements for BS EN 15259, but these are being checked onsite. 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 to be used is the same as that used at other, similar, permitted facilities and have been 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 – A4 will be subject to periodic monitoring in accordance with the requirements of the Medium Combustion Plant Directive (EU2015/2193).

5 Environmental impact assessment

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, 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 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 C6 Questions

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

Q1 About the effluent – details and type, continued

1a Give a brief description of the effluent discharge you want a permit for, for example, treated domestic sewage effluent

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. These liquors have elevated ammonia levels, which have been treated within the installation to reduce their ammonia concentration within the permitted Liquor Treatment Plant.

Lower volume constituents will include rainfall; biogas condensate; siloxane filtrate; boiler blowdown water; contaminated run off and washdown water. 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.

From Point T2 – release via a pumping station wet well.

This effluent comprises waste liquors and surface water drainage from the separated sludge tank area and offloading area for sludge imports to the permitted activity. Drainage in this area, is diverted to the sludge pumping station, from where it is pumped back to the works inlet.

1b Give this effluent a unique name

T1 - Liquor returns

T2 – Liquor returns

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.

Q2 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

Q3 How much do you want to discharge?

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

448.5 Cubic metres

3c What is the maximum rate of discharge?

5.2 Litres / second

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

448.5 cubic metres

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

Q3b – based on the maximum daily site input of 448.5 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 Liquor Treatment Plant inputs, this is the basis of this number. 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.

Q3c – this is based on $(448.5\text{m}^3 / 86400) \times 1000$. Arisings from sources such as dewatering are constant as the plant runs continuously. This gives a value of 5.19097 litres, rounded up to 5.2 litres per second.

Q3d – based on the maximum daily site input of 448.5 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 Liquor Treatment Plant inputs, this is the basis of this number. 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.

Q4 No questions

Q5 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.

Q6 How will the effluent be treated?

6a Do you treat your effluent?

Partially. Dewatering liquors, which make up the bulk of the release from point T1, are subject to pre-treatment to reduce the ammonia loading, in the permitted Liquor Treatment Plant.

Other 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

Order of Treatment	Code Number	Description
First	09	Primary settlement within sewage works
Second	01	Primary biological filtration
Third	01	Secondary biological filtration
Fourth	21	Sand filtration

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/41/45824/R/005.

Q7 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?

At present, no sampling or analysis for all substances listed within the referenced risk assessment at the site has been undertaken. Only limited chemicals are added to the process within the installation boundary, primarily antifoam (in low doses, as required) and polymer to aid dewatering of sludge. A review of the appropriate MSDS data does not indicate the presence of 'specific substances' within those chemicals.

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?

At present, no routine sampling or analysis for all substances listed within the referenced risk assessment at the site has been undertaken either for effluent from the installation or within the wider sewerage catchment. The upstream catchment is managed under the Urban Waste Water Directive and Water Industry Act, with some industrial and commercial users being assessed under the consent to discharge to foul sewer procedure, by Severn Trent Water's commercial waste team. Not all industrial or commercial releases are covered by this process however.

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.

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.

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

Q8 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.

Q9 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?

No sampling point installed at present.

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.

Q10 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 41277 56949

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

Alfreton Brook

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?

Yes

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

3.4 Form C4

1 What waste operations are you applying to vary?

Types of Waste accepted

See Table C3-1b in Section 3.3 above.

EWC codes as listed previously.

1c Deposit for recovery purposes

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

No

2 Point source emissions to air, water and land

See Table C3-2 – Emissions

3 Operating techniques

3a Technical standards

Table C4-3a – Technical standards

Description of waste operation	Appropriate measure (TGN reference)	Document reference (if appropriate)
Other biological treatment of waste: deposit of imported non-hazardous waste for treatment through a wastewater treatment works.	Biological waste treatment: appropriate measures for permitted facilities Updated 6 th July 2023	Biological waste treatment: appropriate measures for permitted facilities - Guidance - GOV.UK (www.gov.uk)

In all cases, describe the type of facility or operation you are applying for and provide site infrastructure plans, location plans and process flow diagrams or block diagrams to help describe the operations and processes undertaken.

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
If the technical guidance or your risk assessment shows that odours are an important issue, send us your plan for managing them.	Odour Management Plan
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

3c Information for specific sectors

N/A

4 Monitoring

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

See response for Form C3 previously

4b Point source emissions to air only

See response for Form C3 previously

3.5 Form B2.5 Questions

Assessed Combustion Plant

MCP specific identifier*	Alfreton- CHP 1	Alfreton – Boiler 1	Alfreton – Boiler 2	Alfreton – Boiler 3
12-digit grid reference or latitude/longitude	E 441294 N 356654	E 441270 N 356643	E 441271 N 356641	E 441272 N 356640
Rated thermal input (MW) of the MCP	1.6	0.6	0.6	0.6
Type of MCP (diesel engine, gas turbine, other engine or other MCP)	Gas engine	Boiler	Boiler	Boiler
Type of fuels used: gas oil (diesel), natural gas, gaseous fuels other than natural gas	Biogas	Dual fuelled (biogas / gas-oil). Modelled with biogas.	Dual fuelled (biogas / gas-oil). Modelled with biogas.	Dual fuelled (biogas / gas-oil). Modelled with biogas.
Date when the new MCP was first put into operation (DD/MM/YYYY)	31/05/2023	Pre-2017	Pre-2017	Pre-2017
Sector of activity of the MCP or the facility in which it is applied (NACE code**)	E.37.00	E.37.00	E.37.00	E.37.00
Expected number of annual operating hours of the MCP and average load in use	8,760 (modelled)	8,760 (modelled)	8,760 (modelled)	8,760 (modelled)
Where the option of exemption under Article 6(8) is used the operator (as identified on Form A) should sign a declaration here that the MCP will not be operated more than the number of hours referred to in this paragraph	N / A	N / A	N / A	N / A

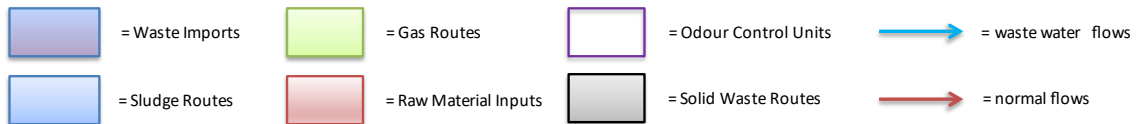
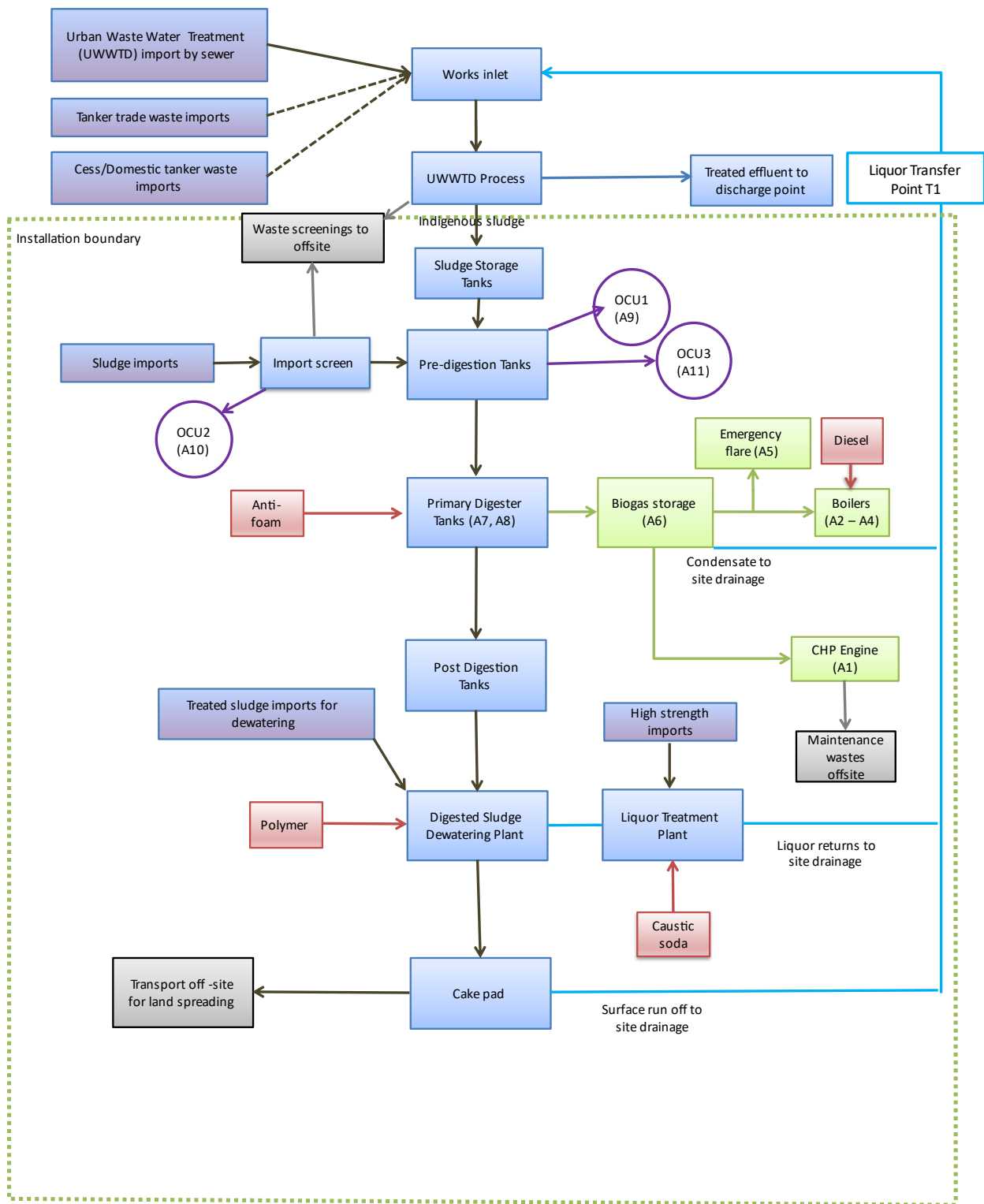
Appendix A. Figures

A.1.1

A.1.2

A.1.3

A.1.4 Process Flow Diagram



Appendix B. Certificates

Appendix C. Air Dispersion Modelling Report

Appendix D. BAT Assessment

Please see appended spreadsheet

Appendix E. 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	Alfreton Sewage Treatment Works, Rodgers Lane, Alfreton, DE55 6AW
National grid reference	SK 4127 5682
Document reference and dates for Site Condition Report at permit application and surrender	Variation Application for bespoke Permit, May 2023
Document references for site plans (including location and boundaries)	Please see site plan in Appendix A and information within Air Quality Impact Assessment.

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: <ul style="list-style-type: none"> • geology • hydrogeology • surface waters 	<p>According to the Environment Agency’s online flood maps, the site is not subject to flooding located in flood zone 1. The Brook to the immediate North of the site is in flood zone 3 with a buffer in flood zone 2.</p> <p>The site is not located within the catchment zone of an SPZ.</p> <p>The geology of the site comprises the following sequence: alluvium (clay, silt sand and gravel) superficial deposits underlain by the Pennine Coal Measures Group. The alluvium is classified as Secondary A Aquifer and the Pennine Coal Measures Group as a Secondary A Aquifer,</p>
Pollution history including: <ul style="list-style-type: none"> • pollution incidents that may have affected land • historical land-uses and associated contaminants 	<p>The site is located in a semi-rural setting on the outskirts of Alfreton with the town to the immediate South of the site.</p> <p>Prior to the 1970’s the site was undeveloped agricultural land becoming a sewage works in the</p>

<ul style="list-style-type: none"> any visual/olfactory evidence of existing contamination evidence of damage to pollution prevention measures 	<p>1970's. Since this time, the site has been a sewage treatment works. The Alfreton Brook was partially filled and realigned to allow for the construction of the sewage treatment works.</p> <p>Development and expansion of the site has taken place since the 1970's at the same time as additional development within the proximity of the site, including engineering works and industrial sites.</p> <p>Environment Agency data on pollution incidents does not identify any pollution incidents (Category 1 and 2).</p>
<p>Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)</p>	<p>There has been a sewage treatment works at the site since the 1970s. The layout of the works and treatment methodologies have varied over time.</p>
<p>Baseline soil and groundwater reference data</p>	<p>None collected</p> <p>Substances that may be present by storage and use within the newly permitted installation are listed within the Tables of the Residue Management Plan. These substances (or similar substances used in the same processes) have been used historically at the site since it first operated.</p> <p>The following substances may be 'relevant hazardous substances':</p> <ul style="list-style-type: none"> Diesel Oil Grease Anti-freeze <p>These substances are stored with the CHP engine, and are used in their routine operation and maintenance.</p> <p>All other hazardous substances have been removed from assessment as they are not considered relevant. This is because storage and use are controlled at the site.</p> <p>Substances are stored within suitably engineered containers/with containment and volumes are small enough for spillage to be contained prior to reaching a sensitive environment. Use of substances is carefully managed to minimise the likelihood of an accidental release.</p>
<p>Supporting information</p>	<p>Severn Trent Water has not collected baseline data at this time and acknowledges the risks that this may pose when it comes to surrender of the permit. However, there are no plans to close the site in the foreseeable future</p>

<h3>3.0 Permitted activities</h3>	
<p>Permitted activities</p>	<p>Operation of an anaerobic digestion plant for sewage sludge waste and imported sewage sludge</p>

	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: <ul style="list-style-type: none"> • 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?	If yes, provide a plan showing the changes to the activity boundary.
Have there been any changes to the permitted activities?	If yes, provide a description of the changes to the permitted activities
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	If yes, list of them
Checklist of supporting information	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Description of soil gas and/or water monitoring undertaken • Monitoring results (including graphs)
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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	<ul style="list-style-type: none"> • Site closure plan • List of potential sources of pollution risk • Investigation and remediation reports (where relevant)
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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	<ul style="list-style-type: none"> • 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)
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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 F. Odour Management Plan