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Minworth Environmental Permit Variation Application Supporting Document

Severn Trent Water Ltd

13 February 2026

5209362/003/RPT/001

MINWORTH ENVIRONMENTAL PERMIT VARIATION APPLICATION

EPR/BP3631SW/V011

Notice

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Project	Minworth Environmental Permit Variation Application
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INTRODUCTION

This document provides information in support of Severn Trent Water Limited's (STW) application for a variation to its Environmental Permit for the Minworth Sludge Digestion and Combined Heat and Power (CHP) Plant (the 'Installation').

The application is made in the context of STW's proposal to make changes to the permit to reflect changes in operations, make corrections to the permit and to update the permit following the Environment Agency's (EA's) review of STW's response to their request for further information – 'Water and sewage company sludge treatment BAT review' issued under Regulation 61. The EA propose to retract the Regulation 61 Notice on submission of this Variation Application, see Appendix A for communication with the EA and pre-application advice.

The installation, which is operated solely by Severn Trent Water Limited, is currently regulated by the Environment Agency (EA) under Consolidated Installation Permit EPR/BP3631SW/V010.

The variation application information pack comprises this supporting document together with the following:

- Form A – About you.
- Form C2 – General – varying a bespoke permit.
- Form C3 – Variation to a bespoke installation.
- Form F – Charges and declarations.
- Report "Minworth THP Environmental Permit Variation Application – Air Quality Assessment", 7 September 2017.

Proposed Changes to Operations

This application is made to request changes to the current Permit to reflect changes in operation and other amendments to the permit, specified as follows:

- Remove Engine 6 (emission point A6) and move Engine 8 (emission point A11) to Engine 6 location (emission point A6). The emissions profile will not change materially and there will be no increase in environmental risk which is demonstrated in this report.
- Allow imported digestate to be dewatered and stored on the existing cake storage area (no physical changes required and no increase in storage capacity).
- Remove hazardous wastes listed in the permit in Schedule 2 and associated activities in Table S1.1.
- Update combustion plant information in Schedule 1 to more accurately and consistently describe the combustion plant.
- Update combustion plant information and regularise emission limits in Schedule 3.
- Update the throughput into the anaerobic digestion (AD) plant to include both imported sludge and indigenous (pre-thickened) sludge.
- Update the permit following the Environment Agency's (EA's) review of STW's response to their request for further information – 'Water and sewage company sludge treatment BAT review' issued under Regulation 61

1. Non-Technical Summary

1.1 Introduction

The Minworth Sludge Digestion and Combined Heat and Power (CHP) Plant treats sewage sludge by anaerobic digestion to produce a stabilised sludge product and biogas. The sludge product is taken off site for land spreading or to alternative outlets. The biogas is exported to the natural gas transmission network via gas to grid facilities, and also combusted to generate heat and power for use in the installation and the wider wastewater treatment works (WWTW).

1.2 Overview of the Facility and Proposed Activities

STW's activities are located within the permit boundary, as shown on the site plan in Appendix B. There are no changes to the permit boundary. The proposed changes comprise:

- Remove Engine 6 (emission point A6) and move Engine 8 (emission point A11) to Engine 6 location (emission point A6). The emissions profile will not change materially and there will be no increase in environmental risk which is demonstrated in this report.
- Allow imported digestate to be dewatered and stored on the existing cake storage area (no physical changes required and no increase in storage capacity).
- Remove hazardous wastes listed in the permit in Schedule 2 and associated activities in Table S1.1.
- Update combustion plant information in Schedule 1 to more accurately and consistently describe the combustion plant.
- Update combustion plant information and regularise emission limits in Schedule 3.
- Update the throughput into the anaerobic digestion (AD) plant to include both imported sludge and indigenous (pre-thickened) sludge.
- Update the permit following the Environment Agency's (EA's) review of STW's response to their request for further information – 'Water and sewage company sludge treatment BAT review' issued under Regulation 61.

1.3 Description of the Site and its Surroundings

Minworth Sewage Treatment Works is located in an industrialised area on the outskirts of Birmingham in Minworth. The AD Facility is located within the Minworth WwTW site boundary (see Appendix B).

To the North of the facility lie commercial units, residential properties with farmland beyond. To the East and South lie the WwTW and farmland beyond the boundary. The River Tame is close to the Southern boundary of the wider WwTW separated by woodland and Water Orton Lane. Commercial units and residential properties are situated along the Western site boundary, separated from the site by woodland and Water Orton Lane.

The closest receptor is a distribution business within an industrial site located 352m South of the AD Facility. The closest residential receptors are the residential properties 526m to the West. Industrial units then agricultural land lie to the West and North of the facility, and area of open land is situated to the East and South of the facility. The town of Minworth and further industrial units are to the West of the facility. Birmingham and Fazeley Canal is located 740m North of the Installation. The River Tame is located 450m to the South.

The Facility is situated within Flood Zones 1, 2 and 3, although the area benefits from flood defences to the Southwest of the site. The AD Facility (and wider WwTW) is not within a groundwater source protection zone however it is located over a Secondary B Aquifer in the bedrock, and a Secondary A Aquifer in the superficial drift. The nearest surface water feature is the River Tame which is to the South of the AD Facility.

1.4 Emissions

The only proposed change affecting emissions from the Installation is to remove Engine 6 and replace it with the existing Engine 8. Both engines are the same size, type and emit essentially the same quantity of pollutants and operate for the same number of hours (or less). As one engine will be removed resulting in one less emission point, there will be an overall reduction in air emissions.

The receipt of digestate from other STW facilities will not change the emissions profile as wastes are similar in nature, form and constituents to the digestate currently dewatered and stored on-site. There will be no increase in treatment or storage capacity.

Removal of hazardous wastes will not materially change the emissions profile associated with the AD facility.

Other proposed changes require updates to the permit and do not involve changes to operations or infrastructure therefore the emissions profile will not change as a result.

There are no changes which would result in additional fugitive emissions released from the Installation.

1.5 Noise and Vibration

There are no changes which would result in additional noise emissions. As one engine will be removed, there will be an overall reduction in noise emissions.

1.6 Management and Control

STW maintains and operates the Installation in line with an Environmental Management System (EMS) which is certified to ISO14001:2015 and has been written in accordance with EA guidance. The EMS will be updated to take account of the proposed minor changes to operations. The Odour Management Plan (OMP) will be updated to include the acceptance of digestate from other STW facilities.

1.7 Waste Generation

There are no changes which would result in changes to wastes generated, other than a small reduction in maintenance wastes generated as a result of removing one engine.

1.8 Accidents and their Consequences

STW maintains an Accident Management Plan (AMP). There are no changes which are likely to affect the potential for accidents at the Facility. The AMP has been reviewed and no material updates are required as a result of the proposed changes.

1.9 Overall Environmental Impact

The potential for impact on the environment as a consequence of the proposed changes in operation of the Facility has been assessed and there are no additional impacts anticipated. As one engine will be removed, there will be an overall reduction in emissions to air and noise generation. Other changes do not materially change emissions including potential accidental releases and the removal of hazardous wastes will reduce the overall risk profile of the installation.

1.10 Application Information

Table 1-1 below provides information about the Operator as required by Application Form A.

Table 1-1 – Application Information

Type of Application	Bespoke Installation Permit Variation Application
Permit Application Reference	EPR/BP3631SW/V011
Installation Name	Minworth Sludge Digestion and Combined Heat and Power Plant
Installation Address	Minworth Sewage Treatment Works, Kingsbury Road, Minworth, Sutton Coldfield, West Midlands, B76 9DP
Company Name & Registration Number	Severn Trent Water Limited 02366686
Registered Address	Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ
Installation Grid Reference	SP 16606 91947
Pre-Application Discussion	A pre-application request was submitted to the EA on 9 August 2024. A response was received on 19 August 2024, which is included in Appendix A of this report.
Legal Status of Operator	Severn Trent Water is a limited company, Company certificates have been provided in this application in Appendix C.
Application Contact	Joanne Chapman PIEMA CRWM (with pre-agreed delegated authority to sign the F1 form, see Appendix C.3.1.) Waste Regulations Specialist, Environmental Regulations and Permits Team Mobile: 07850602321
Operational Contact	Adrian Bancroft Solutions Manager in Bioresources Mobile: 07979707642

2. Proposed Changes to existing activities and the permit

2.1 Introduction

At Minworth WWTW the Sludge Digestion and CHP Plant treats sewage sludge by anaerobic digestion to produce a stabilised sludge product (digestate) and biogas. The sludge product is taken off site for land spreading or to alternative outlets. Some of the biogas is exported to the national gas grid via gas-to-grid facilities, and some is combusted on-site to generate heat and power for use in the installation and the wider WWTW.

This section provides a description of the proposed changes to the Installation.

2.2 Proposed Combustion Plant Changes

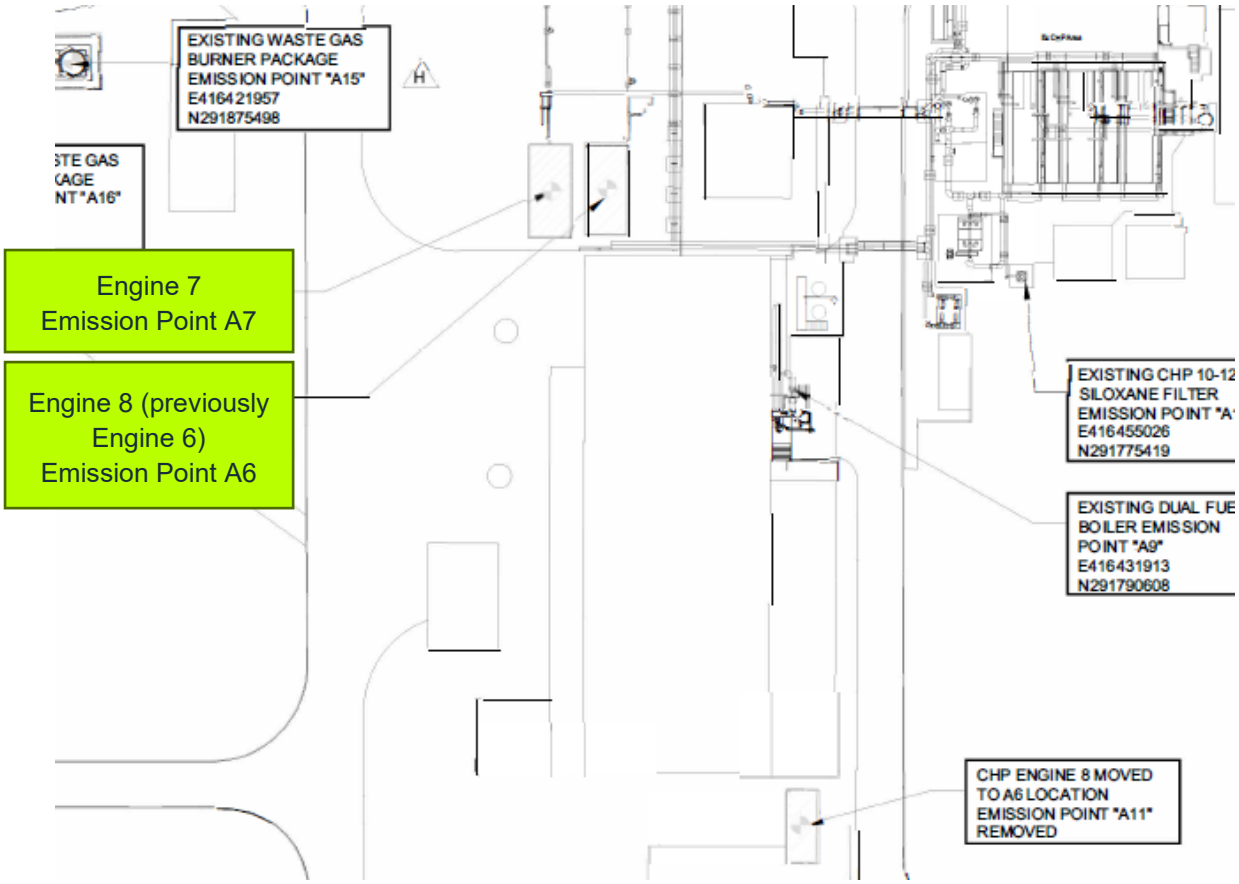
STW is proposing to remove Engine 6 and replace it with existing Engine 8. Both engines share almost identical characteristics, being the same make and model, but with Engine 8 being more recently manufactured and operate for the same number of hours (or less). Characteristics are described in Table 2-1 below.

Table 2-1 – Engine Information

Parameter	Engine 6	Engine 8
Make and Model	Jenbacher 320 GS-BL	Jenbacher 320 GS-BL
Capacity (MWth)	2.692	2.692
Electrical Output (MWe)	1.1	1.1
Stack height (m)	6	6
Normalised flow rate, 15% O2 dry basis, Nm3/s	1.1	1.1
Discharge velocity, m/s	18.6	18.6
Flue gas discharge temperature, °C	510	455
NOx emission (5% O_2)	500mg/Nm^3	500mg/Nm^3
NOx emission (15% O_2)	190mg/Nm^3	190mg/Nm^3
NOx (as NO2) emission rate, g/s	0.21	0.21
Location (OS grid)	416440.7, 291832.0	416377, 291764

Figure 2-2 below shows the respective locations of Engine 6 and Engine 8. As shown on the figure, the two engines are close together (approximately 90m apart) which means that the emissions profile from the combustion plant is unlikely to materially change as a result of moving the engine. Additionally, the engines are used infrequently and there will be two engines instead of three, therefore potential overall emissions should decrease.

Figure 2-2 –Location of Engines 6 (removed), 7 and 8



2.3 Import of Digestate from Alternative STW AD Facilities

There is an existing digestate dewatering process and cake storage area on-site which is dedicated to the treatment and storage of digestate produced in the on-site AD plant. STW proposes to use both the dewatering plant and cake storage area to stored digestate from other STW processes, to provide contingency to these sites in the event that digestate cannot be spread onto land, such as during prolonged periods of wet or dry weather.

The cake storage area comprises a large area of concrete hardstanding with sealed construction joints. The cake is stored without a cover, and following issue of other similar STW permits, it is proposed that a cover is not required as a result of these changes. This is on the basis that the digestate can be proved to be 'stable'. As such, STW would welcome an improvement condition in the permit to demonstrate stability of the digestate, similar to the improvement condition included in the Roundhill Sewage Treatment Works permit, referenced EPR/KB3701FK, reproduced below.

The operator shall submit a written report, with supporting evidence, on the stability of digestate stored within storage tanks, including the 'secondary digester tanks' and the 'centrifuge balancing tank' and obtain the Environment Agency's written approval to it. The report shall assess whether an effective digestion process has taken place within the anaerobic digestion tanks and whether biogas emissions from post digestion storage or treatment are minimised. The report shall assess digester stability and the potential for biogas production. The report shall include but not be limited to:

- *An assessment of residual biogas potential in accordance with the OFW004-005 [N6] methodology specified by BSI PAS 110: Producing Quality Anaerobic Digestate or an equivalent methodology for assessing residual biogas potential.*
- *An assessment of the stability of the digestion process in the primary anaerobic digesters, to be undertaken in accordance with BAT 38 of the Waste Treatment BREF. The assessment shall be supported by process monitoring data recorded using an automatic and/or manual monitoring system (and sampling of the digester feed) for the following parameters over a period of one month:*
    - *pH and alkalinity of the digester feed*
    - *digester operating temperature*
    - *hydraulic loading rate*
    - *organic loading rate*
    - *volatile fatty acids concentration*
    - *ammonia*
    - *liquid and foam levels in the digester*

Acceptance of digestate from other Severn Trent permitted facilities would be subject to the Waste pre-acceptance and Acceptance details within Importing Digestate SOP.

The proposed changes to Schedule 1 in the Permit are included in **Error! Reference source not found.** below.

Table 2-3 – Addition of Waste Activity in Permit

Activity reference	Description of activities for waste operations (new activity)	Description of specified activity and WFD Annex I and II operations	Limits of specified activity and waste types
AR12	Treatment and temporary storage of digestate and digested cake from other STW facilities	R3: Recycling/reclamation of organic substances which are not used as solvents R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	From receipt of the waste to the production of treated waste, including: ▪ Gravity belt thickeners; ▪ Centrifuges; ▪ Dewatering Plant. Waste types suitable for acceptance are limited to non-hazardous wastes. Storage and treatment of digestate cake on an impermeable surface with sealed drainage system; including mixing with lime, if necessary, to achieve pathogen kill prior to despatch of site.

2.4 Removal of Hazardous Wastes from Permit

A decision has been made by STW to cease acceptance of hazardous waste into the tanker import points at the head of the sewage works. This is a permitted activity and a variation to the tanker import waste operation (permit ref: UP3392FB) will be applied for separately.

The consequence of cessation of acceptance of tankered hazardous wastes is the requirement to remove hazardous wastes from the AD permit to mirror the wastes accepted under the tanker import permit referenced above. An updated list of wastes and their EWC codes is provided in Appendix G and the changes to Schedule 1 in the Permit are included in Table 2-4 below.

Table 2-4 – Changes to Hazardous Waste Activity AR2

Activity reference	Activity listed in Schedule 1 of the EP Regulations	Description of specified activity and WFD Annex I and II operations	Limits of specified activity and waste types	Proposed changes
AR2	Section 5.3 Part A(1) (a)(i) Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving biological treatment	Biological treatment by anaerobic digestion of hazardous waste R3: Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).	From receipt of hazardous waste to the transfer of treated wastes to further treatment, recovery or disposal of hazardous waste. Waste types suitable for acceptance are limited to those specified in Tables S2.2, S2.3 and S2.4.	Remove activity

The cessation of accepting hazardous wastes will not result in any changes to operations, infrastructure or the site boundary.

2.5 Additional Proposed Changes to Permit

In addition to operational changes described above, this application is made to request changes to the current Permit, specified as follows:

- Update combustion plant information in Schedule 1 to more accurately and consistently describe the combustion plant;
- Update combustion plant information and regularise emission limits in Schedule 3.
- Update the throughput into the anaerobic digestion (AD) plant to include both imported sludge and indigenous (pre-thickened) sludge.

2.5.1 Updating Combustion Plant Information

Table 2-5 below describes the proposed changes which are required to the Permit in detail, cross-referenced to the sections of the Permit which require changing. Some of the proposed changes are to align the permit with MCPD requirements and others are to correct errors in the permit.

Table 2-5 – Changes to Combustion Plant Permit Information

Plant Item	Air Emissions Point in Permit	Proposed changes to combustion plant description	Amendments to Thermal Input (MWth)	MCPD ELV table	Fuel Type	Operating Hours	Proposed Changes to BP3631SW/V010 Permit Table S1.1 Activity AR5	Proposed Changes to BP3631SW/V010 Permit Table S3.1
Engine 6 (Jenbacher JMS320)	A6	Remove Engine 6 and replace with Engine 8.	2.692	Table 3 - existing engine	Biogas	8000	NA – engine is being removed (note that the emission point remains in situ).	1. NOx, CO - Remove 'plus service intervals every 1000 hours (+/- 100 hours) with weekly Testos readings' to align with MCPD requirements and other combustion plant. 2. Remove 'sulphur' as there are no requirements associated with it or clarify monitoring requirements. 3. Clarify monitoring method for CO and Total VOCs - some text appears to be missing.
Engine 7 (Jenbacher JMS320)	A7	No change	2.692	Table 3 - existing engine	Biogas	8000	1. Change 'combustion of biogas in 3 auxiliary CHP engines with an aggregated thermal input not exceeding 7.818MWth' to 'combustion of biogas in 2 auxiliary CHP engines with an aggregated thermal input not exceeding 5.384MWth'.	1. NOx, CO - Remove 'plus service intervals every 1000 hours (+/- 100 hours) with weekly Testos readings' to align with MCPD requirements. 2. Remove 'sulphur' as there are no requirements associated with it or clarify monitoring requirements.

Plant Item	Air Emissions Point in Permit	Proposed changes to combustion plant description	Amendments to Thermal Input (MWth)	MCPD ELV table	Fuel Type	Operating Hours	Proposed Changes to BP3631SW/V010 Permit Table S1.1 Activity AR5	Proposed Changes to BP3631SW/V010 Permit Table S3.1
								3. Clarify monitoring method for CO and Total VOCs - some text appears to be missing.
Engine 8 (Jenbacher)	A11	Engine 8 (moved to engine 6 location (A6))	2.692	Table 3 - existing engine	Biogas	8000	As A6.	Remove emission point A11.
Dual Fuel boiler	A9	Change to - Hot water auxiliary boiler	4.375	Table 1 - Existing small boiler <5MWth	Natural Gas	Variable	1. Change combustion plant name from 'dual fuel boiler' to 'hot water auxiliary boiler'.	1. Add SO_2 limit of 200mg/m^3 from 2030 as boiler is biogas fired. 2. Include boiler emissions monitoring reference conditions as stated in Note 3 of the permit "These limits are based on normal operating conditions and load – temperature 0°C (273K); pressure: 101.3 kPa and oxygen: 3 per cent (dry gas)".

Plant Item	Air Emissions Point in Permit	Proposed changes to combustion plant description	Amendments to Thermal Input (MWth)	MCPD ELV table	Fuel Type	Operating Hours	Proposed Changes to BP3631SW/V010 Permit Table S1.1 Activity AR5	Proposed Changes to BP3631SW/V010 Permit Table S3.1
								3. Change name from 'dual fuel boiler' to 'hot water auxiliary boiler'.
Engine 10, 11, 12 (JMS420)	A14a, b, c	No change	3.375 each	Table 3 - existing engine	Biogas and natural gas	8000	1. Amend Table S1.1 AR5 to replace 10.2MWth with 10.125MWth. 2. Change 'Combustion of biogas or natural gas produced at the on-site anaerobic digestion process in 3 combined heat and power (CHP) engines…' to 'Combustion of biogas or natural gas produced at the on-site anaerobic digestion process or natural gas in CHP engines 10, 11 and 12…'	1. NOx, CO - Remove 'plus service intervals every 1000 hours (+/- 100 hours) with weekly Testos readings' to align with MCPD requirements and other combustion plant. 2. Remove 'sulphur' as there are no requirements associated with it or clarify monitoring requirements. 3. Clarify monitoring method for CO and Total VOCs - some text appears to be missing. 4. Either add separate set of ELVs for burning natural gas, or include footnote for sulphur limit to

Plant Item	Air Emissions Point in Permit	Proposed changes to combustion plant description	Amendments to Thermal Input (MWth)	MCPD ELV table	Fuel Type	Operating Hours	Proposed Changes to BP3631SW/V010 Permit Table S1.1 Activity AR5	Proposed Changes to BP3631SW/V010 Permit Table S3.1
								say that this only applies when burning biogas. 5. Amend size of combustion plant to match Table S1.1 AR5 activity description (3.375MWth each, permit Table 3.1 states that they are 3.408MWth).
Engine 13, 14 (JMS420)	A14d, e	No change	3.375 each	Table 3 - existing engine	Biogas	8000	1. Change 'Combustion of biogas produced at the on-site anaerobic digestion process in 2 combined heat and power (CHP) engines…' to 'Combustion of biogas produced at the on-site anaerobic digestion process in CHP engines 13 and 14 …'	1. Remove CO Limit and replace with monitoring only requirement in line with MCPD requirements and other engines.
Composite boilers (Dunphy)	A14f, g, h	Change name to - Composite steam boilers 1, 2, 3	8.5 each	Table 2 - existing large boiler >5MWth	Biogas and natural gas	8000	1. Change 'Combustion of 'biogas produced at the on-site anaerobic digestion process in 3 composite boilers…' to 'Combustion of biogas and natural gas produced at the on-site anaerobic digestion process	1. Include boiler emissions monitoring reference conditions as stated in Note 3 of the permit "These limits are based on normal operating conditions and load – temperature 0°C (273K);

Plant Item	Air Emissions Point in Permit	Proposed changes to combustion plant description	Amendments to Thermal Input (MWth)	MCPD ELV table	Fuel Type	Operating Hours	Proposed Changes to BP3631SW/V010 Permit Table S1.1 Activity AR5	Proposed Changes to BP3631SW/V010 Permit Table S3.1
							in composite steam boilers 1, 2 and 3….'	pressure: 101.3 kPa and oxygen: 3 per cent (dry gas)". 2. Change combustion plant name - Composite Steam Boilers 1, 2 and 3 in description.
Total Capacity of all combustion plant			**52.134 MWth (excluding Engine 6 which will be removed)**					
General Change to Table S1.1			Overall change: Add Schedule 1 Activity to this table as combustion plant is over 50MWth on aggregate: SECTION 1.1 Combustion activities- Part A(1) (a) Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts.					

2.5.2 Changes to Throughput Limits in the Permit

The EA now require the AD Plant throughput to reflect indigenous (pre-thickened) sludge as well as effluent which is imported onto site at the head of the works by tanker (acceptance of tankered waste is regulated under a separate permit ref UP3392FB). Therefore, the permit is required to be updated to include the throughput arising from the tankered wastes, and to remove hazardous waste as described above in Section 2.4. There are no changes to operations, plant or equipment, this change is to facilitate a change in the way that the EA present throughput limits in the permit and to remove hazardous wastes from the permit only. The calculation of this amount is presented in Table 2-6 below based on the following input data:

- 16 digesters which are 5200m^3 each, totalling 83,200m^3 capacity
- Retention time of 12 days
- Digester feed % dry solids (April 2024) of 9.83%
- Pre-thickened sludge dry solids of 1%
- Average daily contracted import volume of 500m^3 comprising non-hazardous wastes only

Table 2-6 – Throughput Calculations

Box A Max digester throughput (m^3/d)	**Box B** Tankered imported sludge (m^3/day)	**Box C** Indigenous sludge (m^3/day)	**Box D** Total Dry Solids (TDS/day)	**Box E** Max pre-thickened sludge throughput - indigenous (m^3/day)	**Box F** Total max pre-thickened throughput (m^3/day)	**Box G** Total max pre-thickened throughput (m^3/annum)
6,933	500	6,433	632	63,240	63,740	23,264,978

Notes:

Box A: This is the capacity of all 16 digesters divided by the retention time. The digesters are sized to accepted thickened sludge received following sewage treatment processes. This value has been used to back-calculate pre-thickened volumes in the subsequent calculations.

Box B: Tanker import capacity.

Box C: Calculated by deducting tankered imported sludge volume (Box B) from the total digester throughput (Box A). Indigenous sludge treatment is within the scope of the UWWTD (treatment of indigenous sludge is excluded from the scope of EPR16 and is not part of this permit or permit UP3392FB).

Boxes D and E: Calculations apply the pre-thickened dry solids (9.83%) and the thickened sludge dry solids (1%) percentages to calculate pre-thickened throughput. $\text{Box E} = \frac{\text{Box C x } 9.83\%}{1\%}$

Box F: The sum of the indigenous pre-thickened sludge (Box E) and the tankered imported sludge volumes (Box B).

Box G: Based on the data provided above, we propose that the new throughput limit in the permit, based on the pre-thickened annal throughput, is 23,264,978m^3. $\text{Box G} = \text{Box F x } 365$

2.6 Update Permit following Water and Sewage Company Sludge BAT Review.

STW submitted a report 'Minworth Anaerobic Digestion Facility Regulation 61 Response', March 2022, to the Environment Agency' (EA's) in response to their Regulation 61 request for further information – 'Water and sewage company sludge treatment BAT review' . The report included responses to all questions raised in the Regulation 61 notice which have been included, and updated where required, in this report in Section 3 and in the BAT Assessment in Section 4.

As a result, there may be changes to the Permit, which would be initiated by the EA. Following advice by the EA (see Appendix A), the changes to the Permit would be consolidated with the elements of the variation described above, subject to the determination process.

2.7 Emissions to Air

There are no changes to fugitive emissions released to air as a result of the proposed changes. The acceptance of digestate from off-site STW sources is unlikely to change fugitive emissions released to air as it is similar in nature to digestate already stored and treated on-site. The changes to engines will result in a reduction in emissions due to an overall reduction in combustion capacity.

2.8 Emissions to Water

There are no changes to emissions to water, including fugitive emissions, as a result of the proposed changes.

2.9 Emissions to Land

There are no emissions to land as a result of the proposed changes.

2.10 Odour

There are no additional odorous emissions as a result of the proposed changes. The acceptance of digestate from off-site STW sources is unlikely to change the odour profile of the site as it is similar in nature to digestate already stored and treated on-site.

2.11 Noise and Vibration

There are no changes to the noise profile. The removal of one engine on site should lead to an overall reduction in noise levels.

2.12 Avoidance, Recovery and Disposal of Waste

There are no changes which would result in changes to wastes generated, other than a slight reduction in maintenance wastes from removing one engine.

2.13 Raw and Auxiliary Materials

There are no changes which would result in changes to raw material use, other than a slight reduction in maintenance materials as a result of removing one engine.

2.14 Site Condition and Closure

There are no changes which could impact the closure of the Facility. The following measures have been taken to protect the environment when Engine 6 was removed from site:

- All oils will be drained from the Engine into secure, bunded oil containers.
- Waste oil will be removed from site by authorised waste contractor for recovery at an authorised waste treatment facility.
- Engine 6 will be recovered or disposed in accordance with the waste hierarchy. It will be removed from site by authorised waste contractor for recovery or disposal at an authorised waste treatment facility.

There are no changes to the permit boundary as a result of the proposed changes.

3. Response to Schedule 1 of Regulation 61 Notice

3.1 Introduction

The Regulation 61(1) Notice Requiring Information requires STW to provide information on their operations and whether standards stipulated in the Waste Treatment BAT Conclusions (referred to as 'BATc' in this report) can be achieved by 17th August 2022.

Supplementary to this requirement, the EA also requested additional information on combustion plant, bioaerosols emissions, storage and containment.

3.2 Schedule 1 Response

Table 3-1 below replicates the requirements listed in Schedule 1 of the Regulation 61 letter and states whether they are applicable to the operations carried out by STW.

Table 3-1 – Applicability of Schedule 1

Ref	Description of Information Required	Relevance to the Facility
BAT 1. For each BAT conclusion and its individual sub-elements, including Associated Emission Levels and description of techniques, listed in Annex 1 of this notice:		
a	Confirm whether or not you currently comply with each requirement, providing a description of how you meet the standard.	Applicable. See Section 4 of this Report.
b	Where you do not currently comply with a requirement, describe how you intend to fully comply with the requirement by 17th August 2022 (hereafter referred to as the compliance date), and the date by which you expect to comply if before the compliance date.	Applicable. See Section 4 of this Report.
c	Where you intend to undertake the activity using alternative technique(s), you will need to provide the Environment Agency with evidence that this technique will provide a level of environmental protection equivalent to BAT. Confirm this intention.	Not applicable.
d	Where you intend to cease operating an activity which would not comply with a requirement by the compliance date, confirm this intention.	Not applicable.
e	Where your activity has above ground storage or primary containment, describe any secondary containment and whether it currently meets the relevant standard in the "Containment systems for the prevention of pollution (C736)" report.	Applicable. Site containment is in place via an enclosed site drainage that feeds back to the head of the treatment works.

Ref	Description of Information Required	Relevance to the Facility
		A containment review has been undertaken which is included in Appendix J 'Minworth Digesters and Sludge Tank IED Containment Assessment – Proposed Options Report, Jacobs, July 2024 (referred to as the 'Containment Review' in this report.
f	Further to 1(e), where you have concluded that secondary containment is not required or does not need to meet the standards in the C736 report, explain why the current design and construction is fit for purpose, and enable a baseline standard so as to establish a quantified comparison.	As above.
Combustion Plant 2. Confirm whether you have a combustion plant and/or generator associated with your permitted activity, as per Schedule 25A of The Environmental Permitting (England and Wales) Regulations 2018 (as amended), and provide:		
a	The information specified in Annex I to the Medium Combustion Plant Directive	See Table 3-2.
b	Confirmation as to whether: your operation is subject to a capacity market agreement arising from the 2014 or 2015 capacity auctions (whether or not the generator came into operation before 1 December 2016); or whether a Feed-in Tariff preliminary accreditation application was received by the Gas and Electricity Markets Authority before 1 December 2016.	The opportunity to enter into capacity market agreements is under investigation by STW, however, currently, no agreements are in place. STW do not intend to enter into, and do not currently have in place, Feed-in Tariff contracts.
3. Bioaerosols Monitoring		
a	State if your operational processes of biodegradable waste are in the open within 250m of human receptors.	The digestate cake pad at this facility is open and approximately 450m from the nearest receptors.
b	Confirm if you have channelled or point source releases within 250m that are open sources e.g., biofilters within 250m of human sensitive receptors.	There are human receptors within 250m of the biofilter exhaust or other channelled sources on-site. See bioaerosols report in Appendix K.
c	Confirm if your Permit already requires bioaerosols monitoring.	STW's Permit referenced EPR/BP3631SW does not require bioaerosols monitoring.
4. Hazardous Substances Where your activity involves the use, production or release of a relevant hazardous substance (as defined in Article 3 (18) of the Industrial Emissions Directive), carry out a risk assessment		

Ref	Description of Information Required	Relevance to the Facility
considering the possibility of soil and groundwater contamination at the installation with such substances. Where any risk of such contamination is established either:		
a	Prepare and submit a baseline report containing information necessary to determine with current state of soil and groundwater contamination	See Appendix F for Environmental Risk Assessment which assesses risks to soil and groundwater from the storage of such materials. It concludes that risks are 'very low' and therefore there are no ongoing risks of contamination to the soil and groundwater.
OR		
b	Provide a summary report referring to information previously submitted where you are satisfied that such information represents the current state of soil and groundwater contamination.	
5. Odour		
5	An odour management plan is required for all permits which carry out biological treatment of waste. Confirm whether this permit has a current, up-to-date odour management plan. If it does not you must provide one. Particular attention must be paid to odour containment, effectiveness of abatement plant and design and you should follow the H4 guidance.	There is a current Odour Management Plan (OMP) in place at the Minworth AD Facility. See Appendix H. No substantiated odour complaints have been received at site.
6	If you no longer wish to operate as an installation, inform us of this, and explain whether you intend to cease operations or apply to vary your permit to a waste operation instead.	The intention is to continue operating as an installation.

3.3 Annex 1 to the Medium Combustion Plant Directive

Table 3-2 below outlines the requirements listed in Annex I to the Medium Combustion Plant Directive.

Table 3-2 – Information Specified in Annex I to the Medium Combustion Plant Directive

Information	Response
1. Rated thermal input (MW) of the medium combustion plant.	See Table 2-5.
2. Type of the medium combustion plant (diesel engine, gas turbine, dual fuel engine, other engine or other medium combustion plant).	See Table 2-5.
3. Type and share of fuels used according to the fuel categories laid down in Annex II.	Engine 6 – removed. Engines 7 & 8 – 100% biogas. Engines 10, 11 &12 – 94% natural gas, 6% biogas. Engines 13 &14 – 100% biogas. 3No. composite boilers - 100% biogas.

Information	Response
	1No. Hot water auxiliary boiler – 100% natural gas.
4. Date of the start of the operation of the medium combustion plant or, where the exact date of the start of the operation is unknown, proof of the fact that the operation started before 20 December 2018.	Engine 6 – removed. Engine 7 - first operated in 2003. Engine 8 - first operated in 2010. Engines 10, 11 &12 – first operated in 2014, they were recommissioned with the Permit varied under V009 to operate on dual fuels in 2021. Engines 13 &14 – first operated in 2017. 3No composite boilers first operated in 2017. 1No hot water auxiliary boiler first operated in 1985, converted to natural gas (only) firing in 2015.
5. Sector of activity of the medium combustion plant or the facility in which it is applied (NACE code).	37000 - Sewerage.
6. Expected number of annual operating hours of the medium combustion plant and average load in use.	Engines 6 – removed. Engines 7 & 8 – approximately 8000 hours per annum. Engines 10, 11 &12 - approximately 8000 hours per annum. Engines 13 &14 – approximately 8000 hours per annum. 3No composite boilers - approximately 8000 hours per annum (duty standby with two boilers operating during normal operation). 1No auxiliary dual fuel boiler – not operated since 2015, however there are proposals to re-commission this boiler. Combustion plant may operate up to 100% load (variable).
7. Where the option of exemption under Article 6(3) or Article 6(8) is used, a declaration signed by the operator that the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs.	NA.
8. Name and registered office of the operator and, in the case of stationary medium combustion plants, the address where the plant is located.	**Name:** Severn Trent Water Limited **Registered Office:** Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ **Site Address:** Minworth Sludge Digestion and Combined Heat and Power Plant, Minworth Sewage Treatment Works, Kingsbury Road, Sutton Coldfield, Birmingham, B76 9DP

4. BAT Conclusions general

4.1 Introduction

This section of the application reviews any implications of the changes to the activities at the Installation with regard to compliance with Best Available Techniques (BAT) and other regulatory standards, specifically addressing the indicative BAT contained in the relevant technical guidance, the Waste Treatment BAT Document (BATc).

This section also addresses the specific BATcs outlined in Schedule 1 of the Regulation 61 Notice. Where standards may not be currently met, improvements have been identified to ensure that all standards are achieved.

This section of the report reviews the main techniques that will be used to prevent, or where not practicable, minimise emissions as a consequence of the operation of the changes to the Installation; and demonstrates how the proposed facility continues to apply BAT by prevention of emissions as a priority, or where emissions are minimised by treatment prior to release.

The BATc applicable to the Installation is the 'Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing BATc for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (notified under document C(2018) 5070)', referred to as the 'Waste Treatment BATc'.

4.2 General BAT Conclusions

4.2.1 BAT 1 – Environmental Management System

BAT 1 requires operators to ensure that the sector specific features listed within this BATc are incorporated into Minworth AD Facility's Environmental Management System (EMS).

STW has an EMS in place which is certified to ISO 14001:2015 Environmental Management Systems and covers operations of all STW operated sites, including permitted sites with AD assets. The ISO 14001 Certificate is available on request. A summary of the EMS is provided in Appendix D.

A comparison with BAT requirements is provided in Table 4-1 below.

Table 4-1 – BAT 1: Environmental Management System

Technique	Details	Implemented? Y/N?
BAT 1. In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:		
i) commitment of the management, including senior management;	Implementation of STW's Environmental Policy is approved by the STW Executive Committee of the STW Board and is the responsibility of all employees, with the Chief Executive being accountable for its implementation. Policy available on request or via website.	Y

Technique	Details	Implemented? Y/N?
ii) definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation;	STW's EMS includes a commitment to continuous improvement, and this is included in the policy.	Y
iii) planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment;	Procedures are in place to identify and control environmental issues arising from company activities, as well as requirements from the Legal Register and Permit. Risks are raised and managed at the appropriate level - Operational or Enterprise risks. Sites are required to achieve operational control of their activities.	Y
iv) implementation of procedures paying particular attention to: ▪ structure and responsibility recruitment, ▪ training, awareness and competence ▪ communication ▪ employee involvement documentation ▪ effective process control ▪ maintenance programmes ▪ emergency preparedness and response ▪ safeguarding compliance with environmental legislation	STW's EMS includes procedures which cover all items.	Y
v) checking performance and taking corrective action, paying particular attention to: ▪ monitoring and measurement ▪ corrective and preventive action ▪ maintenance of records ▪ independent (where practicable) internal and external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained	STW's EMS includes procedures which allow for checking of performance and preventative and corrective actions. Monitoring checks are completed as necessary and records are maintained, including use of SCADA systems for electronic records.	Y
vi) review, by senior management, of the EMS and its	STW's EMS is subject to a Senior Management Review minimum once per	Y

Technique	Details	Implemented? Y/N?
continuing suitability, adequacy and effectiveness	year. Cascaded via Senior Management to local teams during Communication Cells (regular team performance meetings).	
vii) following the development of cleaner technologies	Regular review of the EMS allows for inclusion of cleaner technologies as opportunities to include them arise. A dedicated team are in place to consider these through the innovation processes and trials are happening at various locations, as discussed with local EA officers.	Y
viii) consideration for the environmental impacts from the eventual decommissioning of the plant at the stage of designing a new plant, and throughout its operating life	Site Closure Plan in place.	Y
ix) application of sectoral benchmarking on a regular basis	Sectoral benchmarking is carried out on an ad-hoc basis, via STW's participation in Water UK and Biosolids schemes, and through the OFWAT performance process.	Y
x) waste stream management (see BAT 2)	This requirement is met - see BAT 2.	Y
xi) an inventory of waste water and waste gas streams (BAT 3)	This requirement is met - see BAT 3.	Y
xii) residues management plan	See Appendix M for Raw Materials, Water and Waste Residue Management Plan (RMWWRMP). Procedures and operational controls are in place to minimise generation of waste associated with site activities. Raw materials, Water & Residues Management Plan available on request. Where there is a use on site, this is preferable, for example, use of biogas to create heat and power. Where waste is unavoidable, the waste hierarchy is applied to manage the recycling, recovery or disposal. This is carried out by a specific framework contract partner and covered by our Managing Contractors procedure. Waste management is audited as part of the EMS.	Y
xiii) accident management plan	An Accident Management Plan (AMP) is in place. See BAT 21, Section 4.7.	Y
xiv) odour management plan (see BAT 12)	An Odour Management Plan (OMP) is in place. See BAT 12, Section 4.4.1.	Y

Technique	Details	Implemented? Y/N?
xv) noise and vibration management plan (see BAT 17)	A Noise and Vibration Management Plan is not required for the Minworth AD Facility. See BAT 17, Section 4.5.1.	NA

In conclusion, the EMS in place at the Minworth AD Facility meets the requirements of the Waste Treatment BATc.

4.2.2 BAT 2 – Waste Management Techniques

BAT 2 requires Operators to improve the overall performance of their plants. Table 4-2 describes how the Minworth AD Facility meets these requirements.

Table 4-2 – BAT 2: Waste Management Techniques

Technique	Details	Implemented? Y/N?
BAT 2. In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.		
a) waste characterisation and pre-acceptance procedures	See procedures in Appendix D. Waste pre-acceptance procedures are part of site's EMS. Checks are completed prior to setting new customers up on the system. Domestic tankered loads wastes are controlled by the issue of data logger 'key fobs', which are only issued once the pre-acceptance checks have been completed. For tankered trade customers, pre-acceptance checks include a suite of 29 routine lab tests, as well as visual, odour and physical property assessments, with additional tests if identified as appropriate for the waste stream. STW's 'Waste Approval Form' requests information from customers about the origin of waste, any known compounds or composition of waste, in addition to formal waste classification carried out in accordance with the joint UK regulatory authority's 'Guidance on the classification and assessment of waste' (1st Edition v1.2.GB) Technical Guidance WM3, last updated October 2021. Digestate from other STW facilities will be subject to the same high standards of waste pre-acceptance and acceptance. See Section 2.3 for details of this change in operation.	Y
b) waste acceptance procedures	See procedures in Appendix D. Waste acceptance procedures are part of site's EMS. Digestate from other STW facilities will be subject to the same high standards of waste acceptance and acceptance. See Section 2.3 for details of this change in operation.	Y

Technique	Details	Implemented? Y/N?
c) waste tracking system and inventory	Waste tracking is not undertaken as imported materials are not stored or held separately on site. The imported waste (excluding Urban Wastewater Treatment Directive (UWWTD) derived waste from the sewer system) is tracked through the pre-acceptance process on the internal Commercial Waste Information Database (CWID) system and logged to which discharge point it was discharged into the process, volumes received, strength/result of on-site tests and non-conformances. Retention times within the process are understood, and digestate outputs are tracked to land via Biosolids Assurance Scheme (BAS).	NA
d) output quality management system	Outputs are subject to the requirements of the Sludge Use in Agriculture Regulations 1989 (SUiAR), and in accordance with the BAS. Digested sludge cake output is subject to regular testing and corrective action plans to manage non-compliance. Inputs are reviewed in the case of output failure or compliance alert.	Y
e) waste segregation	NA. Waste is only accepted by the site for biological treatment or screening following waste pre-acceptance and waste acceptance procedures that include compatibility checks. There is no segregation of waste.	NA
f) waste compatibility prior to mixing or blending of waste	Waste is only accepted by the site for biological treatment or screening following waste pre-acceptance and waste acceptance procedures. Different wastes are not typically mixed prior to input to the UWWTD sewage inlet point. Where this does occur in holding tanks, compatibility check procedures are in place as required at the pre-acceptance stage. This site receives compatible waste streams.	Y
g) sort incoming solid waste	Solid waste is limited to raw sewage cake which enters the Minworth AD Facility directly into the hopper prior to entry into the digester or digestate from other STW facilities (see Section 2.3), which will be dewatered and stored on-site. NA	NA

In conclusion, the waste pre-acceptance and acceptance procedures in place at the Minworth AD Facility meet the requirements of the Waste Treatment BATc.

4.2.3 BAT 3 - Reduction of Emissions to Water and Air

BAT 3 requires operators to establish and maintain an inventory of wastewater and waste gas streams, as part of an EMS, to facilitate the reduction in emissions to water and air. Table 4-3 describes BAT 3 requirements and STW's mitigation measures.

Table 4-3 – BAT 3: Reduction of Emissions to Water and Air

Technique	Details	Implemented? Y/N?
BAT 3. In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of wastewater and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:		
i) Information about the characteristics of the waste to be treated and the waste treatment processes, including: a) Simplified process flow sheets that show the origin of the emissions; b) Descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances.	The site has a block flow diagram (see Appendix B.4) for its operations available within the EMS, and plant performance is monitored through the site Supervisory control and data acquisition (SCADA) system and STW's 'Golden Measures' management controls. Output quality is monitored at various points (cake quality, biogas quality).	Y
ii) Information about the characteristics of the waste water streams, such as: a) Average values and variability of flow, pH, temperatures and conductivity; b) Average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorous, metals, priority substances/micropollutants); c) Data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)) (see BAT 52).	No monitoring is currently required in the Permit and monitoring of aqueous emissions is not currently carried out. There are no process emissions directly to water resulting from activities at the Minworth AD Facility. All liquids are transferred from the permitted area to the head of the sewage treatment works via site drainage for treatment and discharge under a separate Water Discharge Activity Environmental Permit.	NA
iii) Information about the characteristics of the waste gas streams, such as: a) Average values and variability of flow and temperature; b) Average concentration and load values of relevant substances and their variability (e.g. organic compounds, POPs such as PCBs); c) Flammability, lower and higher explosive limits, reactivity; d) Presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, nitrogen, water vapour, dust).	Monitoring of air emissions is carried out in accordance with the Environmental Permit. See Section 4.3 and Section 6.	Y

In conclusion, STW can demonstrate a good understanding of waste gas streams from the Minworth AD Facility and the requirements of the Waste Treatment BATc are met. There are no process emissions released directly into waterbodies and no monitoring is currently carried out.

4.2.4 BAT 4 – Storage of Waste

BAT 4 requires operators to describe how they will reduce the environmental risks associated with the storage of waste. Table 4-4 below describes BAT 4 requirements and STW's mitigation measures.

Table 4-4 – BAT 4: Storage of Waste

Technique	Details	Implemented? Y/N?
BAT 4. In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.		
a) optimised storage location	Generally applicable directly to new plants. However, storage locations are optimised within the constraints of operating within an existing site.	Y
b) adequate storage capacity	Storage capacity is controlled through the retention times within the biological treatment system, including the use of any holding tanks installed with known capacities. Imported loads are restricted based on volume/loading on the works. These are discussed company-wide on a daily morning call. Any issues with tanks are reported and should capacity become an operational issue, imported loads will be diverted to other STW sites. Waste storage capacity at the Minworth AD Facility is provided in Table 4-5 below. The site is currently permitted to accept 430,000 tonnes of non-hazardous waste and 34,750 tonnes of hazardous waste annually (excluding indigenous UWWTD derived sludge from within the WWTW). The throughput will need to be increased in the Permit to reflect the acceptance of pre-thickened indigenous sludge. See Section 2.5.2. For tankered imports: Bookings are only made when there is adequate capacity, having checked with site that available tank capacity is sufficient. Tank levels are monitored during discharge. Auto-lock off is in place to prevent waste being offloaded into the AD Facility site unless there is sufficient capacity. Contingency arrangements are in place as follows: **Waste Imports:** The indigenous sludge is treated on site as the priority, and additional capacity can be used for imported sludges (interworks). Each site operational team and the Sludge Tanker Planning team have agreed delivery plans based on capacity headroom, as well as daily morning meetings to discuss any amendments to that plan for that day. If there are operational issues on any site, tankered sludge will be sent to another STW facility for treatment. STW have several sludge treatment facilities available across the region so there is no need to exceed capacity on any one site. **Digestate Cake Pad Capacity:** Site stocks are recorded and reviewed weekly. An annual delivery plan is	Y

Technique	Details	Implemented? Y/N?
	developed with weekly reviews between the BioSolids Team and STW appointed contractors to develop and monitor delivery plans to balance site stocks with operational resources and weather conditions. Contingency plans for additional on-site storage are also in place for national issues (for example in the event of agricultural diseases such as Foot & Mouth Disease) which would prevent access to land. See Section 2.3 for details of this change in operation. Storage capacity will not change as a result of accepting off-site digestate.	
c) safe storage capacity	Storage is controlled through the provision of site transfer pipework for tanker offloading and loading. There is a design standard for these assets, and the discharge through them is controlled by loggers, and activation fobs. For tankered imports: discharges into holding tanks and inlet works are only permitted through fob activated loggers, and waste types are only accepted after compatibility checks (see Section 4.2.2). The holding tanks discharge via gravity through a flow meter. Tank levels are monitored during discharge. See Section 2.3 for details of the cake pad change in operation. Storage capacity will not change as a result of accepting off-site digestate.	Y
d) separate area for storage and handling of packaged hazardous waste	NA, no packaged waste is accepted.	NA

In conclusion, the waste storage facilities in place at the Minworth AD Facility meet the requirements of the Waste Treatment BATc.

Table 4-5 –On-site Storage Capacity

Element	Capacity	Total Capacity
Raw sludge balancing tanks (x3)	2 x 1,000m^3 1 x 250m^3	2,250m^3
SAS balancing tank	130m^3	130m^3
Reception/ blending tanks (x3)	760m^3 each	2,280m^3
Raw dewatering buffer tanks (x2)	1,375m^3 each	2,750m^3
Imported cake bin	30m^3	30m^3
THP feed silos (x3)	300m^3 each	900m^3
THP streams (x3)	Pulper Tank 18.73m^3 Flash Tank 18.73m^3	203.58 m^3

Element	Capacity	Total Capacity
	Each reactor 7.6m^3 (4 reactors per stream)	
Digesters (x16)	Approx. 5,300m^3 each	84,800m^3
Gas Holders (x2)	4,000m^3 each	8,000m^3
Post digestion tanks (x14)	5,200m^3 each	72,800m^3
Anammox	Balance tank 700m^3 Pre aeration tank 785m^3 2 x pre clarifiers 235m^3 2 x reactors 1706m^3	5,367m^3
Digestate Cake Pad (x12 Bays) – no change as a result of accepting digestate from off-site sources.	28,500m^3 (total)	28,500m^3
	Total	**208,011m^3**

4.2.5 BAT 5 – Handling and Transfer of Waste

BAT 5 requires Operators to consider the risks posed by the handling and transfer of waste at their Facilities, the likelihood of accidents and incidents posed by these activities along with their environmental impact. Table 4-6 describes the requirements and STW's mitigation measures.

Table 4-6 – BAT 5: Handling and Transfer of Waste

Technique	Details	Implemented? Y/N?
BAT 5. In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.		
a) handling and transfer of wastes by competent staff	The day-to-day management of the Minworth AD Facility is overseen by competent managers, as demonstrated by approval under the Competence Management System. The Competence Management System, developed by Energy & Utility Skills, and approved by Defra and the Welsh Government, is a technical scheme that enables operators of waste installations to demonstrate technically competent management of their permitted activities. All staff are appropriately trained in site procedures and all waste management procedures are covered by the EMS. Non-UWWTD imports are accepted by dedicated, trained staff under the UKAS accredited Competence Management System. See Section 2.3 for details of the cake pad change in operation. Treatment capacity will not change as a result of accepting off-site digestate. Waste is similar	Y

Technique	Details	Implemented? Y/N?
	in nature and risk to digestate currently produced at the Installation.	
b) handling and transfer of waste are duly documented, validated and verified	Standard acceptance procedures for the handling of incoming wastes are adhered to and any deviations have to be approved. Cake from off-site sources will be documented as per other wastes.	Y
c) prevent, detect and mitigate spills	Routine inspections ensure that all site infrastructure and machinery is kept in good working order, with the overall aim being to ensure the AD process is kept at an optimal operational level while reducing environmental risk. Spill kits are available on site and staff are trained to use them. Operating procedures are in place to prevent spills and the use of spill kits should any spill occur.	Y
d) operation and design precautions when mixing or blending wastes	The AD process is fully regulated using a purpose designed software computer package.	NA

In conclusion, waste handling and transfers meet the requirements of the Waste Treatment BATc.

4.3 Monitoring

There is no process emissions released directly to water resulting from activities at the Minworth AD Facility. All liquids are transferred from the permitted area to the head of the sewage treatment works via site drainage for treatment and discharge under a separate Water Discharge Activity Environmental Permit. Table 4-7 describes the requirements and STW's mitigation measures.

Table 4-7 – BAT 6: Monitoring of Emissions to Water

Technique	Details	Implemented? Y/N?
BAT 6. For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pretreatment, at the inlet to the final treatment, at the point where the emission leaves the installation).	The Waste Treatment BATc states that 'in the case of an indirect discharge to a receiving water body, the monitoring frequency may be reduced if the downstream waste water treatment plant abates the pollutants concerned'. Given the large scale and complexity of the Minworth WWTW, which receives effluent from the Minworth AD Facility, the multi-stage treatment processes employed are readily able to treat the type of emissions which arise from the AD process. Such	NA [Note 1]

Technique	Details	Implemented? Y/N?
	emissions comprise only centrifuge liquors, condensate and surface water. As there is likely to be minimal impact arising from the small volume of emissions arising from the Minworth AD Facility no site-based monitoring is currently carried out. There are no additional releases to water arising from the proposed changes.	
BAT 7. BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	As above, there are no process emissions released directly to water resulting from activities at the Minworth AD Facility and no site-based monitoring is currently carried out. There are no additional releases to water arising from the proposed changes.	NA [Note 1]
Note 1: There is currently no monitoring carried out on emission to water (via the WwTW). We would welcome discussion with the EA to determine monitoring requirements.		

4.3.1 BAT 8 – Emissions to Air: Monitoring Frequency

BAT 8 is to monitor channelled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

Point source emissions to air from the Minworth AD Facility are associated with the following plant and equipment:

- Combustion plant (engines and boilers)
- Odour control units
- Flares
- Vents and pressure relief valves
- Gas compressors
- Biogas upgrading plant

STW carry out routine monitoring in accordance with the requirements in their permit; these emissions are monitored periodically by MCerts qualified monitoring specialists and, where required, on eSCADA and tracked locally via Golden Measures on site.

Additional monitoring is required to fully comply with the requirements of the Waste Treatment BATc and MCPD, which is described in Section 5. With the additional monitoring, air monitoring meets the requirements of the Waste Treatment BATc.

4.3.2 Changes to Engines - Review of MCPD Requirements

There are no additional point source emissions to air arising from the proposed changes to activities. Engine 6 will be removed from site reducing overall emissions, as described in Section 2.

The Minworth WwTW is a “Chapter 2 Industrial Emissions Directive (IED) installation site”. Operation of the CHP Engines 6 and 8 (and the other combustion plant at the site) are currently both included within the Installation as directly associated activities (Activity AR5 in the Permit Table S1.1).

Each of the combustion units has an individual capacity of less than 15 MWth, which means that although the Installation falls within the scope of EPR16 Section 1.1 Combustion Activities, it does not fall within the scope of Chapter III of the Industrial Emissions Directive (IED): “*Special Provisions for Large Combustion Plant*”.

The Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants, known as The Medium Combustion Plant Directive (MCPD), as implemented by Schedule 25A of EPR16, will apply, at the appropriate compliance dates, to combustion plant having a rated thermal input of greater than 1 MWth. The Specified Generator controls described in Schedule 25B of EPR16 do not apply on a Chapter II IED installation site. Engine 8 is therefore required to meet MCP requirements by the required date. As a minimum, the MCP must meet the appropriate MCPD emission limit values (ELV).

The required date by when compliance must be met is dependent upon whether the MCP is defined as “new” (if it was put into operation on or after 20 December 2018), or “existing” (if it was put into operation before 20 December 2018). Engine 8 came into operation before the December 2018 date and are therefore currently defined as “existing” plant.

The status of an MCP can change from “existing” to “new” if the plant is subject to modifications, if it is:

- Altered or repaired and this changes the ELV for the worse, that is pollution levels are increased; or
- Substantially refurbished and the refurbishment costs are more than 50% of what a new comparable MCP would cost[1].

Moving Engine 8 and removing Engine 6, as described in Section 2, will not trigger either of these conditions and Engine 8 would thus remain “existing” MCP after implementation of the proposed changes. Current permit emission limit values and monitoring requirements reflect MCPD requirements.

Regarding other combustion plant installed on-site, this variation application also seeks to address possible errors in the permit, which include addition of biogas MCPD ELVs in the Permit to fully reflect MCPD requirements for the fuels used at the Installation. See Section 2.5 for details of the suggested amendments, and Section 5 for changes to ELVs and monitoring.

[1] https://www.gov.uk/guidance/medium-combustion-plant-when-you-need-a-permit#when-a-mcp-is-classed-as-new-or-existing.

Application of Best Available Techniques (BAT) has been accepted for both engines during previous permit application, therefore no comparison with BAT standards is required to demonstrate ongoing compliance.

4.3.3 BAT 9 – Emissions to Air: Diffuse

BAT 9 is not applicable to Minworth AD Facility. There are no solvents used on-site.

4.3.4 BAT 10 – Monitoring of Odour Emissions

BAT 10. BAT is to periodically monitor odour emissions. Odour emissions can be monitored using:

- EN standards (e.g. dynamic olfactometry according to EN 13725 in order to determine the odour concentration or EN 16841-1 or -2 in order to determine the odour exposure);
- When applying alternative methods for which no EN standards are available (e.g. estimation of odour impact), ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

Odour monitoring is described in Section 16 of the OMP in Appendix H (see BAT 12 in Section 4.4.1). Principally, the monitoring regime comprises olfactory field odour monitoring (sniff testing), which is carried out by designated STW personnel. The OMP includes:

- Sniff testing to a standard as defined by the EA's H4 Guidance in response to concerns or complaints or when a potential risk of odour pollution is suspected.
- Monitoring of process controls.

  Tasks are either daily, weekly or 6 monthly and are assigned to Site Operators by the Regional Planners on the SAP/ Sitemate system.
- Scheduled emissions monitoring by a specialist contractor.

There have been no substantiated odour complaints received arising from the operation of the Minworth AD Facility.

The proposed changes do not change the odour profile of the site or the approach to odour monitoring, however the additional scenario of transferring digestate from external STW sites has been included in the OMP in Appendix H and the ERA in Section 5.

In conclusion, odour monitoring in place at the Minworth AD Facility meets the requirements of the Waste Treatment BATc.

4.3.5 BAT 11 – Annual Consumption of Water, Energy and Raw Materials & Generation of Residues

STW, as required by Schedule 4, Tables S4.2, 4.3 and 4.4 of Permit reference EPR/BP3631SW, monitors the parameters specified by BAT 11 (raw material consumption including water, energy use and wastes generated). STW has in place a RMWWRMP which is the site management plan covering use of raw materials, water and residues, see Appendix M.

In addition, STW provides information on raw material use and waste generated in their annual Pollution Inventory returns and their Annual Performance Report.

In conclusion, monitoring of water, energy and raw materials use and generation of residues in place at the Minworth AD Facility meets the requirements of the Waste Treatment BATc.

4.4 Emissions to air

4.4.1 BAT 12 – Odour Management Plan

STW's OMP was written in compliance with the EA's guidance note 'Additional guidance for H4 Odour Management: How to Comply with your Environmental Permit', March 2011. STW has a comprehensive OMP in place at the Minworth AD Facility which describes odour sources, mitigation measures, incident management, monitoring and record keeping. Table 4-8 compares BAT requirements and STW's OMP, which is included in Appendix H.

The proposed changes do not change the odour profile of the site, however the additional scenario of transferring digestate from external STW sites has been included in the OMP in Appendix H and the ERA in Section 5.

Table 4-8 – BAT 12: Odour Management Plan

Technique	Details	Implemented? Y/N?
BAT 12. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:		
A protocol containing actions and timelines	No changes identified, and none are required. There are no specific odour issues at the Minworth AD Facility, despite the proximity of receptors, and there is no history of substantiated complaints.	Y
A protocol for conducting odour monitoring as set out in BAT 10	Odour monitoring protocols are described in Section 15 of the OMP.	Y
A protocol for response to identified odour incidents, e.g. complaints	Response to complaints and incidents is included in Section 17 of the OMP.	Y
An odour prevention and reduction programme designed to identify the source(s); to characterize the contributions of the sources; and to implement prevention and/or reduction measures	The OMP characterises sources of odours as well as the respective preventative / reduction measures.	Y

In conclusion, STW has an OMP in place at the Minworth AD Facility which meets the requirements of BAT 12.

4.4.2 BAT 13 – Prevent/ Reduce Odour Emissions

Potentially odorous emissions from the Minworth AD Facility are minimised as treatment activities take place within treatment tanks. Digestate is stable when stored on the cake pad, see Section 2.3 for details. BAT 13 is to minimise odour emissions, as described in Table 4-9 below by using one or more of the techniques.

The proposed changes do not change the odour profile of the site, however the additional scenario of transferring digestate from external STW sites has been included in the OMP in Appendix H and the ERA in Section 5.

Table 4-9 – BAT 13: Prevent or Reduce Odour emissions

Technique	Details	Implemented? Y/N?
BAT 13. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given in BAT 13.		
a) minimising residence times	Waste storage time is minimised prior to digestion. Untreated sludge is stored within closed tanks and vessels. Digestion residence times are designed to ensure process performance is optimised	Y
b) using chemical treatment	H_2S levels are controlled through chemical dosing (carried out in upstream processes outside of the installation boundary).	Y
c) optimising aerobic treatment	NA	NA

In conclusion, measures in place at the Minworth AD Facility meet the requirements of BAT 13, where relevant.

4.4.3 BAT 14 – Prevent/Reduce Diffuse Emissions to Air

BAT 14 requires Operators to describe how they will prevent or reduce diffuse emissions to air from their operations. Table 4-10 sets out the requirements of BAT 14 and describes how operations, including the proposed changes, at the Minworth AD Facility meet these requirements.

Table 4-10 – BAT 14: Prevent or Reduce Odour emissions

Technique	Details	Implemented? Y/N?
BAT 14. In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below.		
a) minimising the number of potential diffuse emissions sources	Key mitigation techniques include: Input material storage times are minimised, treatment processes only take place in tanks. A flare is installed for emergency use. PRVs are only operated in an emergency during instances when the flare is not operational. The plant is subject to PPM. Use of gravity transfer over pumping and appropriate design of piping layout is carried out as far as practicable within the organisation's design codes. Vehicle speed limit to reduce dusts arising from vehicle movements.	N – some improvements are required to address deficiencies including open topped tanks.

Technique	Details	Implemented? Y/N?
	Some plant and equipment (e.g., open topped tanks) may give rise to fugitive emissions.	
b) selection and use of high-integrity equipment	The plant and equipment used at the Minworth AD Facility was sourced from well-known suppliers, which have been widely used at similar facilities within Europe and the UK. Suppliers are only able to be appointed by the Operator if there have been previously approved through our Framework Suppliers processes.	Y
c) corrosion prevention	Construction materials and those materials used within the plant and equipment include corrosion prevention where necessary. Construction materials specified are based on the operational requirements, e.g., stainless steel used in biogas pipework to prevent corrosion.	Y
d) containment, collection and treatment of diffuse emissions	Where possible, storage of waste and material that may generate diffuse emissions is within an enclosed tank/building. There are open topped tanks present on-site which may give rise to diffuse emissions. See Appendix J.2. Waste treatment takes place within contained primary digestion tanks. Dewatering of digestate takes place within an enclosed building which is served by an odour control unit. Cake pad is external and not covered. Emissions from tanks and treatment processes are directed to odour control units as appropriate to treat emissions. PRVs are only operated in an emergency if the flare is not available.	N – some improvements are required to address deficiencies including open topped tanks.
e) dampening	NA	NA
f) maintenance	Routine maintenance is the responsibility of site staff who complete day-to-day activities with the support of approved contractors. Maintenance activities and regular checks are recorded electronically. STW currently maintains equipment on a rolling pro-active maintenance schedule termed ‘Routine Corrective Maintenance’ or RCM. All assets are routinely checked by operators on site and faults are reported and responded to.	Y
g) cleaning of waste treatment and storage areas	Cleaning and regular maintenance of plant and equipment is completed according to manufacturers’ specifications, or as required.	Y

Technique	Details	Implemented? Y/N?
	Waste storage areas are inspected and cleaned down as required as part of routine maintenance and inspection programmes. Spillages are cleaned up as soon as practicable making use of available spill kits.	
h) leak detection and repair (LDAR) programme	An LDAR programme has been implemented at the installation. See Appendix I.	Y

In conclusion, the measures in place at the Minworth AD Facility to prevent diffuse emissions to air broadly meet the requirements of the Waste Treatment BATc, however, some improvements are required to fully meet all requirements.

4.4.4 BAT 15 and BAT 16– Use of Flares

BAT 15 requires Operators to use flaring for safety reasons only, or for non-routine operating conditions (e.g. start-ups, shutdowns). Table 4-11 sets out the requirements of BAT 15 and BAT 16 and describes how operations at the Minworth AD Facility meets these requirements.

Use of the flare is minimised to obtain best value from the biogas generation at the site. The flare is only operated in emergency, for safety purposes and when the engines and/or gas to grid plant are not operating.

Table 4-11 – BAT15 and 16: Use of Flares

Technique	Details	Implemented? Y/N?
BAT 15. BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques in BAT 15.		
a) correct plan design	Minworth AD Facility is equipped with sufficient biogas storage capacity (gas bag), gas to grid facility, and correctly sized CHP engines for its throughput. Flaring or release via high-integrity relief valves is only used in emergency situations.	Y
b) plant management	Minworth AD Facility is managed to optimise biogas production for economic use, via the control of imports. Multiple outlets are available to make use of biogas (gas to grid, gas holder and CHP engine) and imports of waste can be reduced to reduce biogas generation during planned maintenance on key plant.	Y
BAT 16. In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below.		
a) correct design of flaring devices	STW specify ground mounted flares for use when flaring is unavoidable. The flare meets the correct design and operating standards and is serviced annually by external contract partners.	Y

Technique	Details	Implemented? Y/N?
b) monitoring and recording as part of flare management	STW monitors the hours of operation of the flare, in line with the standard requirements of environmental permits issued by the Environment Agency, that is only carrying out emissions monitoring should the flare operate over 10% of annual hours.	Y

In conclusion, operations in place at the Minworth AD Facility relating to the design, use and emissions from flares, meet the requirements of the Waste Treatment BATc.

4.5 Noise and Vibration

4.5.1 BAT 17 – Noise and Vibration Management Plan

BAT 17 is to set up, implement and regularly review a noise and vibration management plan. The applicability of BAT 17 is restricted to cases where noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated.

STW does not routinely prepare noise and vibration plans for sites where there is no history of noise or vibration issues at nearby sensitive receptors. There is no history of substantiated noise or vibration complaints associated with the Minworth AD Facility. Any vibration or noise issues must be reported via the SafetyNet application and investigative and remedial actions would be instigated. Therefore, BAT 17 is not considered to be relevant to the Minworth AD Facility.

4.5.2 BAT 18 – Prevent/ Reduce Noise and Vibration Emissions

BAT 18 requires Operators to prevent or reduce noise and vibration from their operations. As noted above in relation to BAT 17, activities are not inherently noisy and no substantiated complaints have been received. Therefore, BAT 18 is not considered to be relevant to the Minworth AD Facility.

4.6 Emissions to Water

4.6.1 BAT 19 - Optimising Water Use

BAT 19 requires Operators to describe how they will optimise water consumption, reduce the quantity of water generated and reduce emissions to soil and water. Table 4-12 describes how the Minworth AD Facility will meet these requirements.

There are no process emissions released directly into water resulting from activities at the Minworth AD Facility. All liquids are transferred from the permitted area to the head of the sewage treatment works via site drainage for treatment and discharge under a separate Water Discharge Activity Environmental Permit. Site containment is in place via an enclosed site drainage that feeds back to the head of the treatment works.

Table 4-12 – BAT 19: Emissions to Water

Technique	Details	Implemented? Y/N?
BAT 19. In order to optimise water consumption, to reduce the volume of wastewater generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given in BAT 19.		
a) water management	Where possible, final effluent from the UWWTD works is utilised for cleaning operations in place of potable water. All site drains are labelled and drainage survey carried out.	Y
b) water recirculation	Where possible, final effluent from the UWWTD works is utilised for cleaning operations in place of potable water.	Y
c) impermeable surface	Impermeable surfaces are not present in all operational areas, see Appendix B of the Containment Review in Appendix J. Dewatering operations are enclosed in a building and carried out on impermeable surfaces. Digestate cake is stored on an impermeable surface, equipped with drainage channels. Surfacing around holding / mixing tanks; primary and secondary digesters and storage tanks may not be impermeable to materials within the tanks. A Containment Review has recently been carried out to confirm any further requirements, see Appendix J.	N – some improvements are required to address deficiencies.
d) techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels	This requirement is not achieved for all holding and mixing tanks; primary and secondary digesters; and storage tanks. While these are equipped with high level alarms and digesters are monitored for foaming, tanks are not routinely equipped with secondary containment. Isolation valves are installed at appropriate points within the Minworth AD Facility to allow tanks or vessels to be isolated. All drainage within the Minworth AD Facility is captured within the site drainage system and returned to the head of the works. A Containment Review has recently been carried out to confirm any further requirements, see Appendix J.	N – some improvements are required to address deficiencies including open topped tanks.

Technique	Details	Implemented? Y/N?
e) roofing of waste storage and treatment areas	Not all tanks are covered. See Appendix J.2. The digestate cake pad and associated storage is uncovered at the site.	N – some improvements are required to address deficiencies including open topped tanks.
f) segregation of water streams	The site has a single drainage system for both foul and surface water flows, which returns water to the head of the works for full treatment. Drainage survey is available on site, however it is currently being updated. Limited scope to re-engineer drainage system as the facility is a long-established existing working plant.	Y, following update of drainage plan.
g) adequate drainage infrastructure	The site has a single drainage system, which returns water to the head of the works for full treatment via the UWWTD route. Drainage survey is up to date and available on site, all drains have been labelled.	Y
h) design and maintenance provisions to allow detection and repair of leaks	Tanks, vessels and pipework are generally above ground structures and subject to routine visual inspection. Primary digesters have a planned schedule of emptying and cleaning during which they are inspected for integrity and any necessary repairs carried out. Where visual checks identify issues with tanks or vessels these are actioned for addressing, however, replacement of tanks may be limited through the OFWAT regulated process. Retrofitting solutions on existing tanks may be a challenge.	Y
i) appropriate buffer	Not applicable to existing plants.	Y

In conclusion, measures in place to minimise water use and emissions to water at the Minworth AD Facility broadly meet the BAT requirements.

Areas for improvement, relating to site surfacing, roofing and measures to reduce the likelihood and impact of overflows and failures from tanks and vessels have been identified.

4.6.2 BAT 20 – Wastewater Treatment

BAT 20 requires Operators to treat water using an appropriate combination of techniques provided in the BATc document. Process effluent is treated at the adjacent STW Minworth WwTW using physical

and biological treatment processes therefore additional treatment processes described in BAT 20 are not applicable to the installation.

4.7 Emissions from Accidents and Incidents

4.7.1 BAT 21 – Emissions from Accidents and Incidents

STW has in place an Accident Management Plan (AMP) (see Appendix L) which is an operational document to identify and minimise accidental risks.

BAT 21 requires Operators to describe how the environmental consequences from accidents and incidents will be prevented and/or limited. Table 4-13 describes how STW meets these requirements.

Table 4-13 – BAT 21: Emissions from Accidents and Incidents

Technique	Details	Implemented? Y/N?
BAT 21. In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below, as part of the accident management plan (see BAT 1).		
a) protection measures	Security measures prevent unauthorised access to the site, which are monitored 24/7 by STW's security gatehouse. Physical protection methods around vulnerable assets include fencing, bollards and kerbing. Fire detection and automatic safety features are fitted to biogas systems. The site is protected from intruders by secure fencing and fob activated gates.	Y
b) management of incidental / accidental emissions	STW has developed an AMP for Minworth AD Facility, whilst it is a comprehensive document, updates are required to fully meet BAT and EA guidance and cover all foreseeable scenarios and planned changes on-site. See Appendix L. Site drainage system is available to handle firefighting water. Safety features are connected to site SCADA system which is monitored 24/7 with additional visual checks completed by site staff. Incident Response Standard Procedures are in place.	Y
c) incident / accident registration and assessment system	All accidents and incidents are logged within STW's company-wide SafetyNet application. Pollution incident reporting processes are in place and tracked by STW's Regulations Team. Performance and 'lessons learnt' are cascaded during team meetings.	Y

In conclusion, the measures in place at the Minworth AD Facility to prevent or limit the environmental consequences from accidents meet the requirements of the Waste Treatment BATc.

4.8 Material Efficiency

BAT 22 requires the Operator to substitute materials with waste where possible. Raw materials, other than feedstocks, are not used in large quantities, and it is not currently considered feasible to replace them. However, opportunities to substitute a raw material with a waste material will continue to be reviewed by STW if future developments allow substitution to occur. The material efficiency measures in place at the Minworth AD Facility meet the requirements of the Waste Treatment BATc. STW has a RMWWRMP in place which is the site management plan covering use of raw materials, water and residues (see Appendix M).

4.9 Energy Efficiency

Energy efficiency is optimised at the Minworth AD Facility. Biogas is upgraded in the on-site biogas upgrading plant and exports of surplus energy are directed to the national gas or electricity grids. The use of flares is monitored and minimised and energy efficient plant and equipment is specified during asset replacement schemes. Imports of waste are planned to optimise biogas generation and can be diverted to other sites to meet shortfalls or plan for decreases in storage/generation capacity from planned maintenance.

STW employs designated 'Energy Champions' who monitor energy use and CHP technicians who monitor compliance. Energy use is recorded in a Site Energy Management Plan which is reviewed at least every four years.

As described in Section 2.2, STW is proposing to remove Engine 6 and replace it with Engine 8. Both engines share almost identical characteristics, being the same make and model, but with Engine 8 being more recently manufactured. This will result in an overall reduction in energy use due to the removal of one older engine as more gas is fed directly to the national grid and is no longer required for on-site use.

BAT 23 is to use energy efficiently, by applying both techniques given below in Table 4-14, which describes how STW meets these requirements.

Table 4-14 – BAT 23: Energy Efficiency

Technique	Details	Implemented? Y/N?
a) energy efficiency plan	An energy efficiency plan for the Minworth AD Facility is included within the EMS to optimise energy consumption and to plan improvements.	Y
b) energy balance record	STW monitors energy consumption used by Minworth AD Facility in processing waste and the export of electricity generated by CHP engines. Monitoring is completed for all fuel sources.	Y

In conclusion, the measures in place at the Minworth AD Facility to optimise energy efficiency meet the requirements of the Waste Treatment BATc.

4.10 Reuse of Packaging

BAT 24 is to minimise the quantity of waste sent for disposal and to maximise the reuse of packaging. Table 4-15 describes how STW meets these requirements. There is minimal waste generated by the Minworth AD Facility, as input wastes are delivered without packaging. Only small amounts of packaging associated with maintenance are received and where possible, STW will use returnable containers.

Table 4-15 – BAT 24: Reuse of Packaging

Technique	Details	Implemented? Y/N?
BAT 24. In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the residues management plan (see BAT 1).		
Maximise the reuse of packaging	There is limited packaging used on site as all wastes are delivered by tankers. Where possible, bulk deliveries of raw materials are made by tanker, or containers from chemicals used on site are rinsed and returned to the supplier for reuse. Other packaging and containers are segregated and sent off-site for recovery or recycling as appropriate.	Y

In conclusion, measures to re-use packing are in place at the Minworth AD Facility, so far as STW can control, meet the requirements of the Waste Treatment BATc.

4.11 BATs Specific to the Biological Treatment of Waste

4.11.1 BAT 33 – Selection of Waste Input

To reduce odour emissions and improve the overall environmental performance, BAT 33 is to select the waste input. Table 4-16 describes how STW meets these requirements.

This technique consists of carrying out the pre-acceptance, acceptance and sorting of the waste input (see BAT 2) to ensure the suitability of the waste input for the waste treatment, e.g., in terms of nutrient balance, moisture or toxic compounds which may reduce the biological activity.

To prevent the acceptance of unsuitable wastes which may lead to adverse reactions or uncontrolled emissions, systems and procedures are in place to ensure that wastes are subject to appropriate technical appraisal. This ensures their suitability for the proposed treatment route. These checks must be carried out before any decision is made to accept a waste.

Upon arrival on-site, STW will only accept waste to the site if:

- it is a type and quantity listed in the Permit;
- it conforms to the description in the documentation supplied by the producer and holder;
- the waste is biodegradable; and
- conforms to the waste acceptance procedure (see Section 4.2).

Table 4-16 – BAT 33: Selection of Waste Input

Technique	Details	Implemented? Y/N?
BAT 33. In order to reduce odour emissions and to improve the overall environmental performance, BAT is to select the waste input.		
Carrying out pre-acceptance, acceptance and sorting of waste input to ensure suitability for waste treatment	See BAT 2, Section 4.2.2, for details of pre-acceptance and acceptance checks. STW is unable to control indigenous UWWTD inputs. For imported trade wastes under permit UP3392FB (which when mixed with urban waste water and treated through the works is introduced into the Installation as sewage sludge), standardised procedures ensure compatibility tests are conducted where separate waste streams are introduced to others.	Y, where possible

In conclusion, measures to select input wastes are in place at the Minworth AD Facility, so far as STW can control, which meet the requirements of the Waste Treatment BATc.

4.11.2 BAT 34 – Reduce Channelled Emissions to Air: Dust, Organic Compounds and Odorous Compounds

To reduce channelled emissions to air of dust, organic compounds and odorous compounds, BAT 34 is to employ techniques to minimise such emissions. Table 4-17 describes how STW meets these requirements.

Table 4-17 – BAT 34: Reduce Channelled Emissions to Air: Dust, Organic Compounds and Odorous Compounds

Technique	Details	Implemented? Y/N?
BAT 34. In order to reduce channelled emissions to air of dust, organic compounds and odorous compounds, including H_2S and NH_3, BAT is to use one or a combination of the techniques given below.		
a) adsorption	Adsorption odour control units are installed at key locations to control specific odour sources such as emissions from tanks. These units have been designed and appropriately sized for the potentially odorous air source to be treated.	Y
b) biofilter	Odour control units are installed at key locations to control specific odour sources including biofilters. These units have been designed and appropriately sized for the potentially odorous air source to be treated.	Y

Technique	Details	Implemented? Y/N?
	See Section 4.3 in relation to monitoring and emission limits.	
c) fabric filter	Not applicable to this site	NA
d) thermal oxidation	Not applicable to this site	NA
e) wet scrubbing	Not applicable to this site	NA

In conclusion, measures in place at the Minworth AD Facility to reduce channelled emissions meet the requirements of the Waste Treatment BATc.

4.11.3 BAT 35– Reduce Generation of Wastewater and Water Usage

To reduce the generation of wastewater and to reduce water usage, BAT is to use the techniques given in Table 4-18 below, which describes how STW meets these requirements.

Table 4-18 – BAT 35: Reduce Generation of Wastewater and Water Usage

Technique	Details	Implemented? Y/N?
BAT 35. In order to reduce the generation of wastewater and to reduce water usage, BAT is to use all of the techniques given in BAT 35.		
a) segregation of water streams	Not applicable. Generally applicable to new sites.	NA
b) water recirculation	STW recirculates final effluent grade water in place of potable water where possible. Final effluent from dewatering processes is used where needed to re-wet sludge imports prior to introduction to the digestion processes and for cleaning of plant and equipment. Use of clean, potable water is minimised as far as possible where quality management is required.	Y
c) minimisation of the generation of leachate	Not applicable as leachate is not generated.	NA

There is no process effluent released. The measures in place at the Minworth AD Facility to optimise water consumption and minimise emissions to water meet the requirements of the Waste Treatment BATc.

4.11.4 BAT 38– Reduce Emissions to Air: Anaerobic Treatment

To reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters. Table 4-19 describes BAT for minimising emissions to air.

STW employ robust process monitoring controls. Gas quality is measured continuously through the biogas management system and, if required, clean up equipment is installed to control levels of contaminants, e.g., siloxane is removed by siloxane filters. Gas quality is continuously monitored via SCADA and monitored remotely via the CHP team. The engine performance is measured continuously, and all engines are serviced annually.

Table 4-19 – BAT 38: Reduce Emissions to Air: Anaerobic Treatment

Technique	Details	Implemented? Y/N?
BAT 38. In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.		
Implementation of a manual and/or automatic monitoring system to: ▪ ensure a stable digester operation; ▪ minimise operational difficulties, such as foaming, which may lead to odour emissions; ▪ provide sufficient early warning of system failures which may lead to a loss of containment and explosions.	Digester operation is monitored continuously (24 hours per day) using the SCADA system and automatic alarms/monitoring, as well as periodic visual inspection.	Y
Monitoring and/or control of key waste and process parameters, e.g.: ▪ pH and alkalinity of the digester feed; ▪ digester operating temperature; ▪ hydraulic and organic loading rates of the digester feed; ▪ concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate;	Plant performance measures are checked and sampled regularly for digester health and H_2S levels. Monitoring is carried out of the following key operational parameters: ▪ pH and alkalinity of the digester contents; ▪ daily digester operating temperature; ▪ hydraulic and organic loading rates of the digester feed (spot check); ▪ concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate (twice per week); ▪ biogas quantity, composition (e.g. H_2S) and pressure (monitored via SCADA and manually); ▪ liquid and foam levels in the digester (daily).	Y

Technique	Details	Implemented? Y/N?
▪ biogas quantity, composition (e.g. H2S) and pressure; ▪ liquid and foam levels in the digester.	Additional confirmatory testing is carried out through checks on the produced sludge cake to comply with BAS, including pathogen count. This demonstrates if the process is working in the designed manner.	

In conclusion, measures in place at the Minworth AD Facility to reduce emissions to air by monitoring key waste and process parameters meet the requirements of the Waste Treatment BATc.

5. Impact on the Environment

An Environmental Risk Assessment (ERA) has been compiled to determine the environmental risks posed by the proposed changes, and to ensure that there remain no significant impacts on the environment and human health.

In accordance with EA Guidance '*Guidance on additional risk assessments you will need to do for an environmental permit and information about the H1 software tool'* the following assessments have been carried out:

- Air quality, including dispersion modelling;
- Emissions released into surface water, including via sewer;
- Odour emissions;
- Noise emissions;
- Global warming potential;
- Site waste;
- Fugitive releases; and,
- Accidents.

The proposed changes do not impact noise levels. Removal of one engine would likely result in a reduction in overall noise levels. Noise is therefore screened from requiring assessment.

Potential environmental impacts are discussed in this section of the report. The outcome of these assessments is provided in Table 5-3 and Table 5-4, which present the results of the qualitative risk assessments which have been carried out to determine impact from the proposed changes on the environment.

The scope of this ERA includes:

- Changes to the combustion plant
- Acceptance of digestate from alternative STW facilities.

A further ERA is included in Appendix F which addresses Question 4: Hazardous Substances as requested by the Regulation 61 request for information (see Section 3).

5.1 Important and Sensitive Receptors

STW Minworth Sewage Treatment Works is located in an industrialised area to the North East of Birmingham. The location and site boundary remain unchanged, therefore there are no changes which impact any of the receptors described in the original application. However, a review of sensitive receptors was carried out and is presented below.

The closest receptor is a distribution business within an industrial site located 352m South of the AD Facility. The closest residential receptors are the residential properties 526m to the West. Industrial units then agricultural land lie to the West and North of the facility, and area of open land is situated to the East and South of the facility. The town of Minworth and further industrial units are to the West of the facility. Birmingham and Fazeley Canal is located 740m North of the Installation. The River Tame is located 450m to the South.

The following types of designated ecological sites were checked for their presence within 2km of the Installation (national designations) and 10km from the Installation (European designations):

- National Nature Reserve (NNR);
- Site of Special Scientific Interest (SSSI);
- Ramsar Site;
- Special Protection Area (SPA); and,
- Special Area of Conservation (SAC).

None of these receptors were located within the screening distance, as confirmed by the EA's Conservation Screening Report (see Appendix A). This screening report provided further information on Local Wildlife Sites (LWS) which are listed, along with other key receptors are summarised in Table 5-1 below. Distances are taken from the centre of the Installation Boundary.

Table 5-1 – Receptors within 2km

Receptor	Type	Distance from Installation	Direction
Sewage Treatment Works including LWS	Industrial and LWS	0m	All
Silver Tree Bakery	Commercial	352m	South
Agricultural Land	Agriculture	450m	South
River Tame LWS	Aqueous/Ecological	450m	South
Tame Valley LWS	Aqueous/Ecological	450m	South
Prologis Business Park	Industrial	460m	South West
Water Orton Sidings LWS	Ecological	500m	South
Residential Properties	Residential	526m	West
WHS Plastics	Industrial	531m	South
Kingsbury Business Park	Commercial	540m	North
Residential properties	Residential	624m	West
Hotel	Commercial	690m	North West
Birmingham and Fazeley Canal LWS	Ecological	740m	North
Agricultural Land	Agriculture	740m	North
Residential properties	Residential	760m	North West
Agricultural Land	Agriculture	840m	North East
Pub	Commercial	851m	North West
Minpoint Business Park	Industrial	860m	West
Residential properties	Residential	1290m	East North East

Receptor	Type	Distance from Installation	Direction
Park Hall LWS	Ecological	1440m	East
Marsh Lane Grassland & Marsh LWS	Aqueous/Ecological	1440m	South East
Water Orton Triangle LWS	Aqueous/Ecological	1440m	South East
Curdworth Primary School	Education	1730m	North East

The following LWSs were identified by the Environment Agency Ecological Screening Report (Appendix A), however they are outside of the screening distance as 2km from the installation boundary.

- Coleshill Sewage Works Grassland LWS
- Coleshill Sludge Lagoons LWS
- Fox Covert LWS
- Bull's Lane Hedges LWS
- Wishaw Meadows LWS
- The Grove Hedge LWS

The Installation is located within a Flood Zones 1, 2 and 3 as shown by Figure 5-2. The area benefits from flood defences which are located to the South of the site along the River Tame.

Figure 5-2 – Flood Zones

The area is not located within a groundwater protection zone. However, it is located over a Secondary B aquifer in the bedrock and a Secondary (undifferentiated) aquifer in the superficial drift. Groundwater vulnerability is classified as Medium – High.

5.2 Assessment of Process Emissions to Air

There are no additional emissions to air, water or land as a result of the proposed changes. As described in Section 2.2, STW is proposing to remove Engine 6 and replace it with Engine 8. Both engines share almost identical characteristics, being the same make and model, but with Engine 8 being more recently manufactured. This will result in an overall reduction in emissions released to air. Characteristics and proposed monitoring are described in Section 6.

As such, the Air Quality Assessment conclusions submitted previously to the EA (Atkins, 7 September 2017) remain valid and with one less engine will overestimate the impact of emissions (see Appendix N).

There are no additional emissions to air arising from importing digestate from external STW facilities. STW.

5.3 Emissions to Water including via Sewer

There are no changes to emissions to water, including via Sewer. Process effluent is treated at the adjacent STW Minworth WwTW using physical and biological treatment processes prior to release, under a separate Water Discharge Activity Permit authorised by the Environment Agency.

5.4 Site Waste

There are no changes to waste management techniques as a result of the proposed change and waste management will continue to be reviewed every four years, as required by the Permit.

5.5 Energy Use

As described in Section 2.2, STW is proposing to remove Engine 6 and replace it with Engine 8. Both engines share almost identical characteristics, being the same make and model, but with Engine 8 being more recently manufactured. This will result in an overall reduction in energy use due to the removal of one engine.

5.6 Global Warming Potential

As described above, there will be an overall reduction in energy use due to the removal of one engine and therefore a reduction in Global Warming Potential. As such, the proposed GWP will be within the scope of the original permit application and previous variation calculations.

5.7 Fugitive Emissions, Accidents and Amenity Impact

Activities will be managed and operated in accordance with the Operator's EMS, which will incorporate the Operator's Emergency Preparedness & Response Procedures. There are minimal additional potential accidents arising from proposed changes as they are similar to current operations. The site's AMP is included in Appendix L and has been updated to include transfers of digestate onto the site.

Potential fugitive releases and corresponding management measures are described in Sections 5.7.1, 5.7.2 and 5.7.3 below and associated risk assessment tables.

5.7.1 Odour

Receptors identified are the surrounding organisations and residential properties.

The proposed changes do not change the odour profile of the site, however the additional scenario of transferring digestate from external STW sites has been included in the OMP in Appendix H and the ERA in Table 5-3. There are no changes to the dewatering process or the storage of cake on the cake pad.

5.7.2 Fugitive Releases to Land and Water

The proposed changes are unlikely to generate increased fugitive emissions to land and water. The potential impact on surface water and land from transferring digestate from external STW sites is described in the qualitative assessment in Table 5-4 which concludes that the risk remains low.

5.7.3 Fugitive Emissions to Air

Receptors identified are the surrounding organisations and residential properties.

The proposed changes are unlikely to generate increased fugitive emissions to air, however the additional scenario of transferring digestate from external STW sites has been included in the OMP in Appendix H. There are no changes to the dewatering process or the storage of cake on the cake pad.

Potential impact from fugitive emissions to air from the new plant and equipment is described in the qualitative assessment in Table 5-3 which concludes that the risk remains low.

5.7.4 Accidents

Accident scenarios have been identified which incorporate controls applicable to the proposed changes. Activities will be managed and operated in accordance with the Operator's EMS, and Emergency Preparedness & Response Procedures will be updated. The site's AMP is included in Appendix L and includes the additional scenario of transferring digestate onto site from external STW sites.

Accident scenarios and management measures associated with the proposed changes have been summarised in Table 5-3 and Table 5-4.

5.8 Risk Assessments Summary

The tables below describe hazards and management measures and assess the main risks to the environment from fugitive releases associated with the proposed changes.

Table 5-3 - Fugitive Emissions to Air Including Odour (additional sources only)

Hazard	Source	Pathway	Receptor	Probability of Exposure	Consequence	Magnitude of risk	Risk Management	Residual risk
Odour released during transfers from digestate delivery vehicles (including odour from spills) from alternative STW facilities into dewatering facility.	Delivery vehicles	Transmission through the air	Local businesses and residents	Low	Low	Low	Residents and businesses are approximately 450m from the cake pad. OMP in place. Deliveries will be supervised by trained staff. Delivery vehicles will be enclosed. Only 'stable' digestate will be transferred onto site. Waste acceptance and pre-acceptance procedures in place. Offensive waste will not be accepted.	Low

Table 5-4 - Fugitive Emissions to Water (additional sources only)

Hazard	Source	Pathway	Receptor	Probability of Exposure	Consequence	Magnitude of risk	Risk Management	Residual risk
Digestate spill during transfers from digestate delivery vehicles from alternative STW facilities into dewatering facility.	Delivery vehicles	Over land into drainage system	Water (via sewage treatment processes)	Low	Low	Low	Site drains are routed to head of works, therefore any spills would be treated throughout extensive sewage treatment processes prior to release. Spill procedure in place. EMS in place. Deliveries will be supervised by trained staff. Delivery vehicles will be enclosed.	Low

6. Emissions and Monitoring

6.1 Introduction

This section sets out the proposed changes emission limit values and monitoring regime for the Installation and describes the impacts of the changes.

6.2 Emissions to Air, Water, Sewer and Land

There are no additional emissions to air, water or land as a result of the proposed changes.

As described in Section 2.2, STW is proposing to remove Engine 6 and replace it with Engine 8. Both engines share almost identical characteristics, being the same make and model, but with Engine 8 being more recently manufactured. This will result in an overall reduction in emissions released to air.

As such, the Air Quality Assessment conclusions submitted previously to the EA (Atkins, 7 September 2017) remain valid and with the removal of one engine will overestimate the impact of emissions following the changes. There are no additional emissions points arising from importing digestate from external STW facilities.

6.3 Proposed Changes to Monitoring and Emission Limits for Combustion Plant

There are possible errors and inconsistencies in the permit (as described in Section 2.5) which require changes to Table S3.1 in the Permit. Changes are required to fully reflect MCPD requirements and improve consistency in monitoring and reporting requirements between the different combustion plants. The proposed amended Permit Table S3.1 is presented in Table 6-1 below with changes highlighted. The monitoring method for TVOCs is requested from the EA for inclusion in the Permit. Justification for the proposed changes is provided in Table 2-5 – Changes to Combustion Plant Permit Information.

Table 6-1 – Proposed Changes to Combustion Plant Monitoring Arrangements

Emission Point Ref. and Location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring Frequency	Monitoring Standard or Method
A6, A7	Jenbacher engines 7 and 8 (biogas fired, 2.692MWth)	Oxides of Nitrogen (NO and NO2 expressed as NOx)	500mg/m3	Average over sample period	Annual	BS EN 14792:2005
		Sulphur dioxide	162mg/m3 [note 2]		Annual	BS EN 14791 or CEN TS 17021 or by calculation based on fuel sulphur
		Carbon monoxide	No limit set		Every 3 years	BS EN 15058
		Total VOCs	No limit set		EA to clarify	EA to clarify monitoring method for Total VOCs.
A9	Hot water auxiliary boiler (natural gas fired, 4.375MWth) [note 3]	Oxides of Nitrogen (NO and NO2 expressed as NOx)	250mg/m3 [note 2]	Average over sample period	Annual	BS EN 14792:2005
A14a, A14b, A14c	Jenbacher engines 10, 11, 12 (3.375MWth) when fired on natural gas [Note 1]	Oxides of Nitrogen (NO and NO2 expressed as NOx)	500mg/m3	Average over sample period	Annual	BS EN 14792:2005
		Carbon monoxide	No limit set		Every 3 years	BS EN 15058
	Jenbacher engines 10, 11, 12 (3.375MWth) when fired on biogas [Note 1]	Sulphur dioxide	162mg/m3 [note 2]		Annual	BS EN 14791 or CEN TS 17021 or by calculation based on fuel sulphur

Emission Point Ref. and Location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring Frequency	Monitoring Standard or Method
		Sulphur dioxide	162mg/m3 [note 2]		Annual	BS EN 14791 or CEN TS 17021 or by calculation based on fuel sulphur
		Carbon monoxide	No limit set		Every 3 years	BS EN 15058
		Total VOCs	No limit set		EA to confirm	BS EN 12619:2013
A14d, A14e	Jenbacher engines 13 and 14 (biogas fired, 3.375MWth) [Note 1]	Oxides of Nitrogen (NO and NO2 expressed as NOx)	500mg/m3	Average over sample period	Annual	BS EN 14792:2005
		Sulphur dioxide	162mg/m3 [note 2]		Annual	BS EN 14791 or CEN TS 17021 or by calculation based on fuel sulphur
		Carbon monoxide	No limit set		Every 3 years	BS EN 15058
		Total VOCs	No limit set		Annual	BS EN 12619:2013
A14f, A14g, A14h	Composite Steam Boilers 1, 2 and 3 (8.5MWth) when fired on biogas [note 3]	Oxides of Nitrogen (NO and NO2 expressed as NOx)	250mg/m3 [note 6]	Average over sample period	Annual	BS EN 14792:2005
		Sulphur dioxide	170mg/m3 [note 6]		Annual	BS EN 14791 or CEN TS 17021 or by calculation based on fuel sulphur
		Carbon monoxide	No limit set [note 6]		Every 3 years	BS EN 15058

Emission Point Ref. and Location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring Frequency	Monitoring Standard or Method
	Composite Steam Boilers 1, 2 and 3 (8.5MWth) when fired on natural gas [note 3]	Oxides of Nitrogen (NO and NO2 expressed as NOx)	200mg/m3 [note 6]	Average over sample period	Annual	BS EN 14792:2005
		Carbon monoxide	No limit set [note 6]		Every 3 years	BS EN 15058

Note 1 – These limits are based on normal operating conditions and load – temperature 0°C (273K); pressure: 101.3 kPa and oxygen: 5 per cent (dry gas).

Note 2 – This emission limit applies from 1 January 2030, unless otherwise advised by the Environment Agency.

Note 3 – These limits are based on normal operating conditions and load – temperature 0°C (273K); pressure: 101.3 kPa and oxygen: 3 per cent (dry gas).

Note 4, Note 5 – These notes in the Permit Table 3.1 are not applicable to the combustion plant which is the subject of this variation.

Note 6 – This emission limit applies from 1 January 2025, unless otherwise advised by the Environment Agency.

Emissions monitoring will continue to meet MCERTS requirements and will be conducted in accordance with the EA's Technical Guidance Note M5: Monitoring of stack gas emissions from medium combustion plants and specified generators, Version 1, September 2018.

6.4 Additional Monitoring Requirements to Comply with the Waste Treatment BATc

Additional monitoring is required to fully comply with the requirements of the Waste Treatment BATc, which is described in Table 6-2 below, supplementary to the monitoring currently required by the Permit. There are several odour units which serve tank vents and similar systems. It is not considered proportionate or necessary to carry out monitoring or impose BAT-AELs to these emissions points, which are listed below:

- A20, A21, A22, A23, A27, A28, A29 - Odour control units for various tank vents which are not operated continuously and are only required during filling or other occasional use.

Table 6-2 –Emissions to Air: Monitoring Frequency

Emission Point	Source	Parameter [1]	Limit mg/Nm³	Monitoring Frequency	Monitoring Standard
A24	Sludge thickening centrifuge odour control unit	TVOC	40	6-monthly	EN 12619
		NH_3 [1]	20 [3, 4]	6-monthly	None
		Odour [2]	No limit proposed [see notes 3, 4]	None	None
		H_2S [2]	NA	6-monthly	None
A25	No. 2 sludge facility odour control unit	There is currently no monitoring carried out on emission from points. We would welcome discussion with the EA to determine monitoring requirements.			
A26	Imported tanker sludge facility odour control unit				
A30	Imported sludge thickening building – odour control unit				
A65	Biofilter exhaust stack				
A73	Biogas upgrading plant –exhaust for odour control system				
A76	Biogas upgrading plant –exhaust for odour control system				
Note 1: The odour concentration may be monitored instead.					

Emission Point	Source	Parameter [1]	Limit mg/Nm³	Monitoring Frequency	Monitoring Standard
Note 2: The monitoring of NH_3 and H_2S can be used as an alternative to the monitoring of the odour concentration. Note 3: Either the BAT-AEL for NH_3 or the BAT-AEL for the odour concentration applies. Note 4: This BAT-AEL does not apply to the treatment of waste mainly composed of manure.					

APPENDICES

Appendix A. Pre-Application Communications with the EA

From: Wager, Tommy <Tommy.Wager@environment-agency.gov.uk>
Sent: Wednesday, June 26, 2024 4:17 PM
To: Joanne Chapman <Joanne.Chapman@severntrent.co.uk>; McAree, Mark <Mark.mcaree@jacobs.com>
Cc: Raymond, Sarah <Sarah.Raymond@environment-agency.gov.uk>
Subject: Resubmission of Minworth BtG/CHP Application - EPR/BP3631SW/V012

Hi Joanne/Mark,

As per our previous discussions regarding hazardous waste acceptance at Minworth (relating the Strongford Pre-app sent previously). We are looking to set a date for the resubmission of the supporting documents for Minworth BtG/CHP.

On review of the Regulation 61 notice for Minworth BtG/CHP we have noted that the activities currently being carried out at site may not be valid as you are currently permitted to accept Hazardous waste, but have not applied for an installation permit for your WwTW.

Therefore, we will be withdrawing the Regulation 61 for Minworth BtG/CHP EPR/BP3631SW/V012, at the point in which a revised Variation is submitted and received. The new variation can incorporate both the changes in line with the WaSC permit review, the removal of hazardous waste acceptance (EWCs and activity) and the variation changes you have asked for, specifically relating changing engine 6 for engine 8 (like for like exchange of CHP engines). You will need to submit the variation as described above, **or** an application for your WwTW to become an installation in its own right by the **26 August 2024**.

The variation you submit will likely be logged EPR/BP3631SW/V013*, superseding the V012, Reg 61 notice as we shall withdraw that on submission.

Kind Regards,

Tommy Wager

Senior Permitting Officer, National Permitting Service
Environment Agency | Trentside Office, Scarrington Road, Nottingham, NG2 5BR

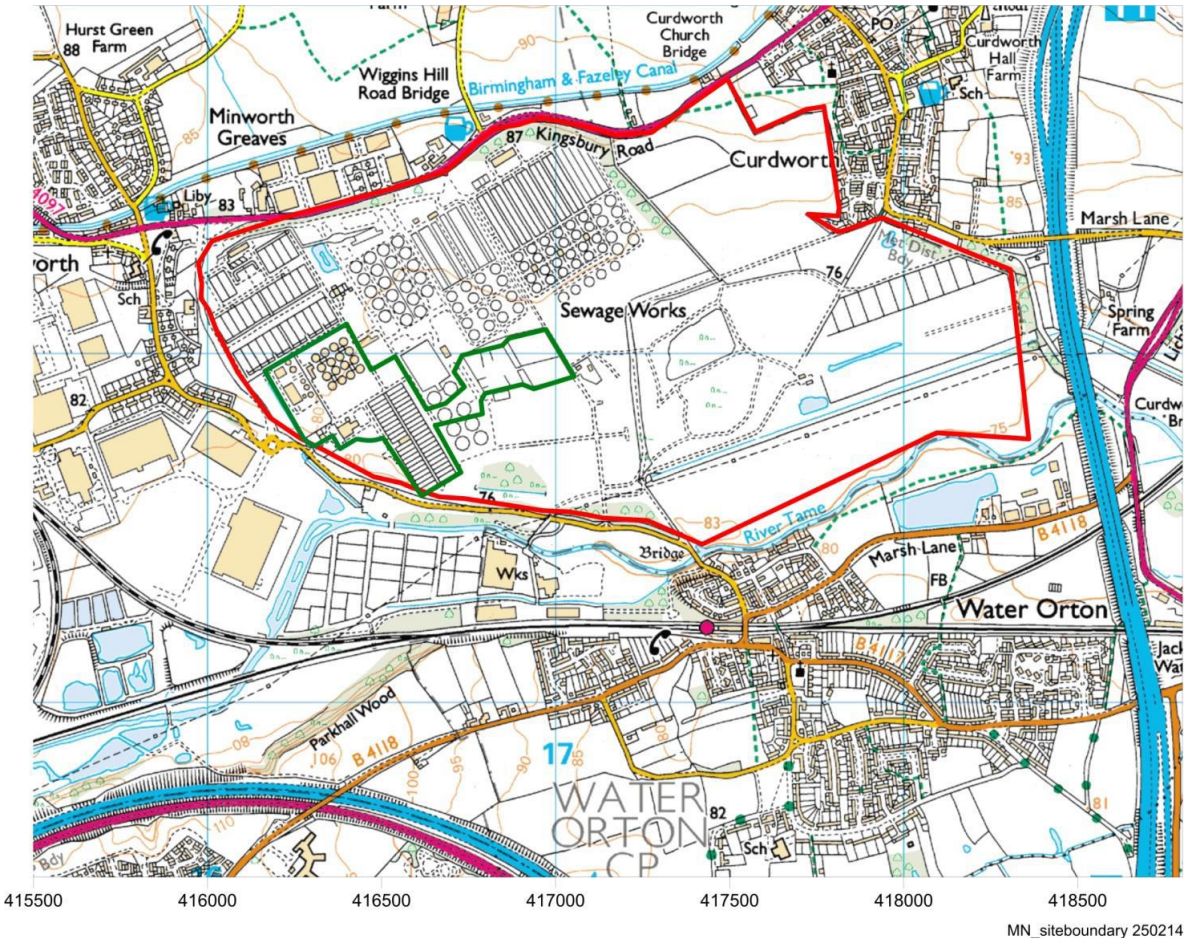
tommy.wager@environment-agency.gov.uk
External: 020 847 48506 | Mobile: 07789948396 | Internal: 28506

*[later corrected to V011]

Appendix B. Site Plans

B.1 Site Location

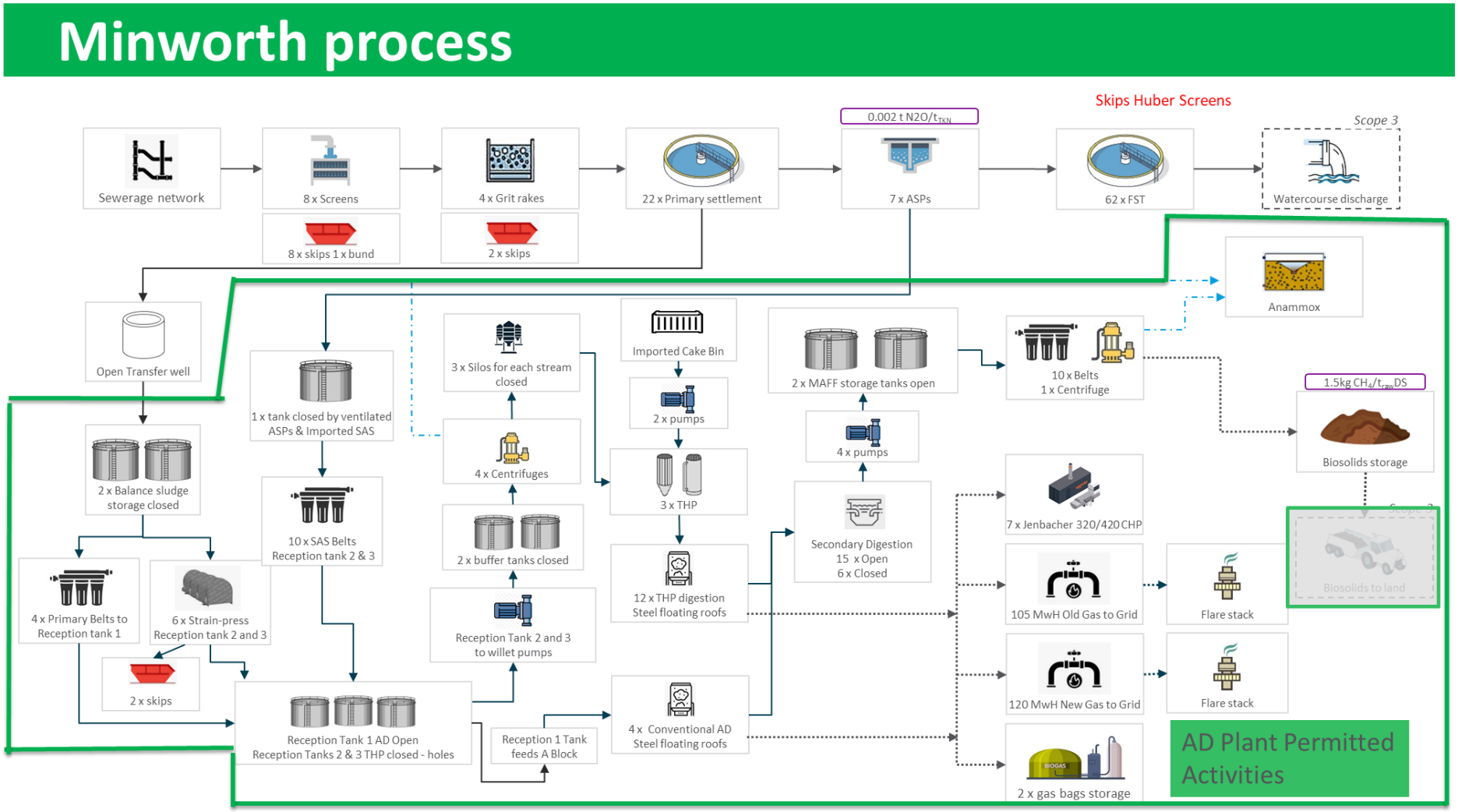
The installation Boundary is shown in green.



B.2 Installation Boundary

B.3 Site Layout Plans

B.4 Block Flow Diagram



Appendix C. Company Information

C.1 Details of STW Directors

Title	First Name	Last Name	Position
Mr	Didar Singh	Dhillon	Company Secretary
Mr	Thomas Auguste Read	Delay	Director
Mr	Anthony Nicholas Seymour	Hampton	Director
Ms	Christine Mary	Hodgson	Director
Mr	James Jon	Jesic	Director
Ms	Sarah Catherine	Legg	Director
Ms	Helen Marie	Miles	Director
Ms	Sharmila	Nebhrajani	Director
Mr	Richard Mark	Taylor	Director

C.2 List of Relevant Offences

With reference to Application Form C2, Item 3a, relevant offences are as follows:

Total payout	Type	Date	Location	Offender	Description of offence
£870,000	Prosecution	June 2020	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 2021	Worcestershire, England	Severn Trent Water Ltd	Sentenced for four breaches of the Regulations for four cases. Sewage was discharged contrary to Regulation 38 (2) of the Environmental Permitting (England and Wales) Regulations 2016. (Blackminster) Breach of a limit contrary to regulation 38(2) Environmental Permitting (England and Wales) Regulations 2016. (Bromsgrove, Stoke Prior, Priest Bridge)

Total payout	Type	Date	Location	Offender	Description of offence
£2,088,658	Prosecution	Feb 2024	Staffordshire. England	Severn Trent Water Ltd	Sewage was discharged into the river in conditions other than those set out in table S3.3 of the Environmental Permit, contrary to Regulation 38 (2) of the Environmental Permitting (England and Wales) Regulations 2016.

C.3 Company Certificate

FILE COPY

CERTIFICATE OF INCORPORATION

OF A PRIVATE LIMITED COMPANY

No. 2366686

I hereby certify that

SEVERN TRENT WATER LIMITED

is this day incorporated under the Companies Act 1985 as a private company and that the Company is limited.

Given under my hand at the Companies Registration Office, Cardiff the 1 APRIL 1989

MR. J. D. CAWLEY

an authorised officer

HC007b

C.3.1 Letter of Authority

2 October 2025

Severn Trent Water Limited

Severn Trent Centre
2 St John's Street
Coventry
CV1 2LZ

Tel 02477 715000
Fax 02477 715871
www.severntrent.com
www.stwater.co.uk

Letter of Authority

I confirm that the individuals listed in Annex 1 are authorised by Severn Trent Water Limited to apply for all Environmental Permits, variations, and permit surrenders required by the Environment Agency and Natural Resources Wales in connection with permittable waste related activities.

Yours sincerely,

Didar Dhillon
Company Secretary
Severn Trent Water Limited

Registered in England & Wales
Registration No. 02366686
Registered Office:
Severn Trent Centre,
2 St John's Street,
Coventry CV1 2LZ

Annex 1

Joanne Chapman
Helen Hill
Cheryl Shepherd
India Cotton
Laura Heathcote
Angela Easton

C.4 EU Skills Certificate

Appendix D. Waste Acceptance SOPs

D.1 Waste Pre-Acceptance

D.2 Waste Acceptance

D.3 Non-Conformance Procedure

D.4 Importing Digestate SOP

Appendix E. EMS Summary

E.1 Scope

Severn Trent Water was awarded certification to BS EN ISO14001:2015 for its Environmental Management System in August 2018. The certified EMS scope covers “Management and delivery of wastewater treatment processes. Transfer and storage of highway waste on depots. Tankered Waste Imports, Sludge Treatment and associated Biogas activities. Mothballed landfill monitoring activities. Head office functions at Severn Trent Centre.”

E.2 Environmental Policy

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

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

E.3 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, the permit compliance advisors and other specialists, assess environmental risks for in-scope areas using a significance scoring method under normal, abnormal and emergency conditions. Significant environmental aspects and impacts take into account legal and other requirements, cost to the business, scale of impact and interested parties.

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

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

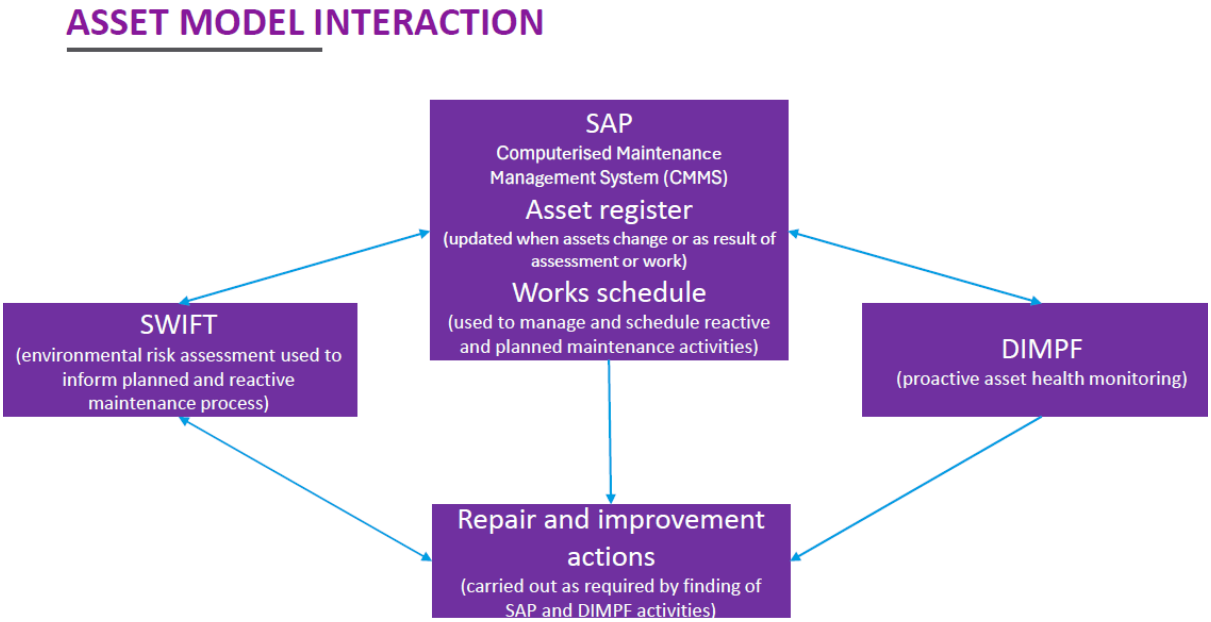
The defined roles and responsibilities are allocated to relevant personnel, depending on their job description, qualifications, knowledge, experience and training. Training and competency are based on specific roles.

E.4 Operational Control

Procedures are in place to identify and control environmental issues arising from Severn Trent Water activities. Each department is required to achieve operational control of its activities and using a central database, identify and record any departmental environmental issues. The DIMPF model is utilised here (Design, Installation, Maintenance, Potential Failure, Functional Failure).

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

Non-routine activities, such as major overhauls/refurbishments, which involve the use of sub-contractors are assessed for health, safety, and environmental risks and method statements are produced to address these, as part of the Managing Contractors process. Contractors who are required to carry out major services are closely managed by the operational 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 without having risk assessments and method statements signed off by a suitably qualified person.



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.

E.5 Maintenance and Monitoring

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

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

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

All regular maintenance of all plant and equipment will be completed on the time scale specified by the equipment manufacturer including routine. A full engine overhaul is likely to be scheduled every 20,000 operating hours. Our 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.

E.6 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 regular Senior Management Review to consider environmental performance, objectives and targets and continual improvement.

E.7 Competence, Training and Training Records

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

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

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.

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 within its Competence Management System (CMS) that is independently certified to meet the requirements of the UKAS accredited Industry Standard. All appointed Technically Competent Persons (TCPs) undergo EMS awareness training and CMS training. TCPs are required to re-take training every 3 years. A list of technically competent persons is stored within the CMS documentation on SharePoint.

E.8 Managing Contractors

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

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

The contactor is required to submit a risk assessment and method statement (RAMS) prior to any commencement of work, identifying how work is to be undertaken and the associated risks. RAMS must be approved by the Site Manager or allocated person 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.

E.9 Incidents, Non-Compliances and Complaints

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

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

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

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

E.10 Communication

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

E.11 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.

E.12 ISO14001 Certificate of Registration (Excerpts)

Certificate of Registration

nqa

This is to certify that the Environmental Management System of:

Severn Trent Water Limited

Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ, United Kingdom

(Central function listed above. See appendix for additional locations)

applicable to:

Management and delivery of wastewater treatment processes. Transfer and storage of highway waste on depots. Tankered Waste Imports, Sludge Treatment and associated Biogas activities. Mothballed landfill monitoring activities. Head office functions at Severn Trent Centre

has been assessed and registered by NQA against the provisions of:

ISO 14001:2015

This registration is subject to the company maintaining an environmental management system, to the above standard, which will be monitored by NQA

Managing Director

UKAS MANAGEMENT SYSTEMS 0075

Certificate No.	4230
ISO Approval Date:	3 May 2011
Reissued:	16 August 2024
Valid Until:	8 August 2027
Prior Cycle Exp Date:	8 August 2024
EAC Code:	39, 27

Page 1 of 119

The use of the UKAS Accreditation Mark indicates accreditation in respect of those activities covered by the accreditation certificate number 015 held by NQA. NQA is a trading name of NQA Certification Limited, Registration No. 09351758. Registered Office: Warwick House, Houghton Hall Park, Houghton Regis, Dunstable Bedfordshire LU5 5ZX, United Kingdom. This certificate is the property of NQA and must be returned on request.

Certificate of Registration

Appendix to Certificate Number: 4230

Includes Facilities Located at:

Severn Trent Water 4230/420 Netheridge Farm Netheridge Close Gloucester GL2 6LE United Kingdom	Management and delivery of wastewater treatment processes
Severn Trent Water 4230/421 Kingsbury Road Minworth Sutton Coldfield West Midlands B76 9DP United Kingdom	Management and delivery of wastewater treatment processes
Severn Trent Water Certificate No. 4230/422 MARCONI WAY Birmingham B46 1DG United Kingdom	Management and delivery of wastewater treatment processes. Transfer, deposition and grit treatment activities
Severn Trent Water Certificate No. 4230/423 Blackwell Lane Melbourne Derby DE73 8EL United Kingdom	Management and delivery of wastewater treatment processes

ISO Approval Date:	3 May 2011
Reissued:	16 August 2024
Valid Until:	8 August 2027
Prior Cycle Exp Date:	8 August 2024

Appendix F. Ground and Groundwater Risk Assessment

Hazard	Pathway	Receptor	Probability of Exposure	Consequence	Risk Management Controls	Residual Risk
Escape of polymer	Flow by gravity	Ground, groundwater, watercourses	Low: Polymer is within a bunded tank.	Medium: Polymer is stored in bulk quantities.	Polymer is stored in a bunded tank. Vessels and secondary containment are inspected routinely. Defects are recorded and rectified. Spills are handled in accordance with site procedure. All filling activities will be supervised and recorded. Stock records are maintained. Spill kits are available on-site. Waste liquids are transferred to head of sewage works where they are treated prior to release.	Very low
Escape of oils, vehicle fuels or maintenance fluids	Flow by gravity	Ground, groundwater, watercourses	Low: Oils and maintenance fluids are located within a building.	Low: Oil is stored in small quantities.	Fluids are used within plant and machinery and for maintenance and refuelling purposes. These containers are provided with secondary containment sized at 110% of the container capacity. Vessels and secondary containment are inspected routinely. Defects are recorded and rectified. Spills are handled in accordance with site procedure. All filling activities will be supervised and recorded. Stock records are maintained. Spill kits are available on-site.	Very low

Hazard	Pathway	Receptor	Probability of Exposure	Consequence	Risk Management Controls	Residual Risk
					Waste oils will be removed from site by an authorised waste contractor. Waste liquids are transferred to head of sewage works where they are treated prior to release.	

Appendix G. Waste Types

Permitted waste types and quantities for anaerobic digestion operation

Maximum quantity	**Annual throughput shall not exceed 23,264,987 tonnes**
Exclusions	Wastes having any of the following characteristics shall not be accepted: ▪ Biodegradable waste that is significantly contaminated with non- compostable or digestible contaminants, in particular plastic and litter shall be no more than 5% w/w and shall be as low as reasonably practicable by 31 December 2025. ▪ Wastes containing wood-preserving agents or other biocides and post- consumer wood. ▪ Wastes containing persistent organic pollutants. ▪ Wastes containing Japanese Knotweed or other invasive plant species listed in the Invasive Species (Amendment etc.) (EU Exit) Regulations 2019. ▪ Manures, slurries and spoiled bedding and straw from farms where animals have notifiable diseases as stipulated in the Animal By-Products (Enforcement) (England) Regulations 2013. ▪ Pest infested waste.
Waste code	**Description**
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)
19 06	**wastes from anaerobic treatment of waste**
19 06 06	digestate from anaerobic treatment of animal and vegetable waste (digested sewage sludge only)
19 08	**wastes from waste water treatment plants not otherwise specified**
19 08 05	sludges from treatment of urban waste water
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 03	**other municipal wastes**
20 03 04	septic tank sludge

Table F2 – Permitted waste types and quantities for dewatering and storage operation

Maximum quantity	Annual throughput shall not exceed 10,000 tonnes of non-hazardous waste.
Exclusions	Wastes having any of the following characteristics shall not be accepted:

	▪ Wastes containing persistent organic pollutants. ▪ Wastes containing Japanese Knotweed or other invasive plant species listed in the Invasive Species (Amendment etc.) (EU Exit) Regulations 2019. ▪ Manures, slurries and spoiled bedding and straw from farms where animals have notifiable diseases as stipulated in the Animal By-Products (Enforcement) (England) Regulations 2013. ▪ Pest infested waste. ▪ Waste containing Hazardous substances (as defined in Environment Permitting Regulations 2016).
Waste code	**Description**
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 06	**wastes from anaerobic treatment of waste**
19 06 06	digestate from anaerobic treatment of animal and vegetable waste (digested sewage sludge only)

Appendix H. Odour Management Plan

Appendix I. LDAR Programme

Appendix J. Containment Information

J.1 Minworth Digesters and Sludge Tank IED Containment Assessment – Proposed Options Report, Jacobs, July 2024 (Containment Review)

J.2 Plan of Tank Covers

Appendix K. Bioaerosols Risk Assessment

Appendix L. Accident Management Plan

Appendix M. RMWWRMP

Appendix N. Air Quality Assessment

Appendix O. Table S1.2 Revisions

Table S1.2 Operating techniques			
Description	**Parts**	**Date Received**	**Suggested Revisions as a Result of this Application**
Application EPR/BP3631SW/A001	The response to section 2.1, excluding 2.1.3 and 2.1.5, and 2.2 in the Application.	31/03/2006	None
Schedule 4 Notice Request dated 04/06/2007	All sections	02/03/2007	None
Receipt of additional information to the application dated 16/072007	All sections	16/07/2007	None
Receipt of additional information pertaining to the variation application	Email response detailing containment measures for all process activities associated with the installation of three new CHP combustion units.	23/01/2014	Amendments to combustion plant as described in Section 2.
Receipt of additional information pertaining to the variation application	Email response detailing the operation of an air virtual stack.	12/03/2014	None

AtkinsRéalis

John Dickson
AtkinsRéalis UK Limited
The Hub
500 Park Avenue
Aztec West
Bristol
BS32 4RZ

Tel: +44 (0)1454 662000
john.dickson@atkinsrealis.com