Sludge Treatment Centre Permitting

Environmental Permit Application - Bishop's Stortford STC Resubmission

TW_STC_EPR_20a_BSD_ASD | Resubmission

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Thames Water

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Sludge Treatment Centre Permitting

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Introduction

This application relates to a biological treatment permit for the Bishop's Stortford Sludge Treatment Centre (STC), located at the Bishop's Stortford Sewage Treatment Works (STW), operated by Thames Water Utilities Ltd (Thames Water). It is being made due to sludge treatment operations within sewage treatment works requiring a suitable Environmental Permit under the Environmental Permitting Regulations 2016 (as amended), in order to comply with the requirements of the Industrial Emissions Directive.

Previously, sewage treatment sites operated by sewerage undertakers treating indigenous sewage sludges ('sludge') separated from the main urban waste water treatment stream at the site along with the importation of similar wastes such as cess wastes and interworks sludge and cake transfers, were regulated under the Urban Waste Water Treatment Directive (UWWTD), and Environmental Permitting Regulations as exempt or waste management activities, although some works had parts of the process, specifically biogas utilisation covered by the Environmental Permitting regime.

Now, all aspects of the sludge treatment process at the site, from the thickening of sludge separated from the main UWWTD treatment stream, blending with imported waste of a similar nature to indigenous sludge and anaerobic digestion of sludge, through to the storage of digested sludge cake prior to recovery to land offsite, including biogas storage and utilisation will fall within the scope of this permit application.

A number of other sewage treatment related activities are undertaken at the site, outside of the scope of this permit, relating to the treatment of waste waters from the sewer network through aerobic processes. These activities are covered by the UWWTD.

1.1 Non-Technical Summary

This application is for a new bespoke installation permit for the biological treatment of sludge, by anaerobic digestion, with a capacity above the relevant thresholds.

The biological treatment of sludge includes treatment of indigenous sewage sludge from the onsite aerobic treatment process and treatment of imported sewage sludges from other sites, arriving by road to a sludge import point. The indigenous sewage sludges are generated from the aerobic treatment of both waste waters from the sewer network arriving into site at the works inlet, and, from imported waste materials, arriving by road transport into a dedicated waste import point at the works inlet. The storage of biogas and operation of a biogas fuelled Combined Heat and Power (CHP) Engine and boilers for the generation of electricity and heat at the site.

The site is located within a rural area, outside of the town of Bishop's Stortford, Hertfordshire and is bounded on all sides by fields, with a number of buildings including both commercial and residential use located next to the site entrance.

The STC treats both indigenous sludges and imported sludges. Indigenous sludge is generated from the incoming flow to the STW, which passes through the aerobic treatment process under the UWWTD. Indigenous sludge is pumped to the Sludge Buffer Tank, via Sludge Screens. Imported sludge from other works is delivered to a sludge offloading point from tankers, is passed via screens and pumped to the Sludge Buffer Tank. All such imports are subject to appropriate waste pre-acceptance and acceptance checks, prior to acceptance. Indigenous and imported sludge combine in the Sludge Buffer Tank.

The STC comprises of an offloading point for permitted imported tankered waste at the works inlet of the sewage treatment works. The waste arrives at the STC via tanker and is discharged directly to the inlet, where it combines with other sewer derived materials and subject to aerobic treatment, under the UWWTD.

All imports will be assessed using the Thames Water standard waste pre-acceptance checks to ensure that they are appropriate for treatment via the UWWTD. Once pre-approved as suitable for treatment via the UWWTD route, the waste carriers are approved. Wastes will be subject to appropriate waste acceptance checks in accordance with

Thames Water procedures. Incoming tanker vehicles will be directed to the inlet offloading point, which is an impermeable surfaced area, equipped with sealed drainage.

Mixed sludge from the Sludge Buffer Tank is then pumped to Sludge Thickening Plant and thickened with the additional of a polymer coagulant. Liquor is returned to the works inlet for additional treatment and thickened sludge is pumped to one of the Primary Digester Tanks. The Sludge Buffer Tank and Sludge Thickening Plant are connected to an Odour Control Unit (OCU) for odour abatement.

Two of the Primary Digester Tanks are of concrete construction, with integral Secondary Digester Tanks, and one is of steel construction. All three tanks are aboveground tanks and fitted with Pressure Relief Valves (PRVs). Sludge is heated via dedicated heat exchange systems using heat generated on site by the CHP Engine or two boilers.

Following treatment over an appropriate number of days within the Primary Digester Tanks, sludge is transferred to one of three aboveground, open topped Secondary Digester Tanks which operate in series. Digested sludge is held in these tanks for an appropriate retention time to ensure that the required level of pathogen kill is achieved in order to comply with digested sludge cake output quality requirements.

Digested sludge is then transferred to the Digested Sludge Buffer Tanks prior to dewatering. Digested sludge is pumped to the Digested Sludge Dewatering Plant. A powder polymer coagulant is added with liquor returning via Return Liquor Pumping Station and the site drainage to the works inlet and digested sludge cake transferred via covered conveyors to the engineered open Cake Pad for storage prior to removal from the site under the Sludge Use in Agriculture Regulations 1989, and in accordance with the Biosolids Assurance Scheme (BAS).

This application includes the import of treated sludge cake from other works, for temporary storage on the site Cake Pad, pending offsite recovery. All such imports will be subject to appropriate waste pre-acceptance and acceptance checks, prior to import, including checking whether the incoming cake complies with the requirements of SUiAR and BAS.

The waste stream is the same as that arising from the treatment of sludge within the Bishop's Stortford STC with the same characteristics, composition and eventual end use - application to land. As such, the infrastructure which is acceptable for use for site cake is appropriate for the imported material.

Cake is stored on an impermeable surface on the Cake Pad, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank.

Biogas from the Primary Digester Tanks is captured and transferred to a double membrane Biogas Storage holder for storage. The biogas transfer pipeline is equipped with condensate pots that capture entrained moisture from the generated biogas and allow it to be drained into the site drainage system for treatment. The Biogas Storage is fitted with pressure release valves (PRVs) as a safety precaution in the event of over pressurising the system. The biogas is taken from the Biogas Storage holder for combustion in a CHP Engine, generating electricity for use within the site, and heat to maintain Primary Digester Tank temperature.

In the event that additional heating is required for the Primary Digester Tanks, there are two dual fuelled auxiliary boiler that can combust biogas or fuel oil. An emergency flare is available for use during periods of essential maintenance and for emergency use. The flare is utilised under 10% of the year or less than 876 hours per year.

There is also one emergency generator at Bishop's Stortford STW that are used for emergency only and regular testing and operate outside of this permit (i.e. are not DAAs).

2. Technical Description

This application is for a new bespoke installation permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended), following a change of interpretation of the UWWTD by the Environment Agency. It relates to a biological waste treatment permit for the Bishop's Stortford STC, located at the Bishop's Stortford STW, operated by Thames Water Utilities Limited (Thames Water).

Scope

The application covers the biological treatment of sewage sludge, both indigenous and imported from other waste water treatment sites, by anaerobic digestion, with a capacity above the relevant thresholds. It also permits the acceptance of portable toilet wastes, cess, along with septic tank, and similar sewage derived materials, to the works inlet for processing through the UWWTD treatment route. There are a number of Directly Associated Activities (DAAs), including the operation of a biogas fuelled CHP Engine for the generation of electricity and heat at the site.

Site Location

The Bishop's Stortford STC is located at Bishop's Stortford STW is located within a rural area, approximately 2 km south-east of the town of Bishop's Stortford. There are fields on all sides of the STW, which is approximately 300 m west of the M1 motorway, 200 m east of the A1060 and 300 m east of the River Stort. There is a property located at the entrance to the wider site, consisting of both commercial and residential properties.

The area of the site is located entirely within a Flood Zone 1, indicating there is a with a low probability of flooding (>1:1000 annual probability of flooding). The site is not located within or adjacent to the boundaries of an Air Quality Management Area (AQMA). The site is located outside of the boundaries of a Source Protection Zone (SPZ).

There are two statutory designated habitat sites within the relevant distances of the site. The closest is Thorley Flood Pound SSSI, which is 1.4 km south-west of the site. The closest designated Local Nature Reserve (LNR) to the site is Flitch Way LNR located to the north-east of the site, at a distance of 1.9 km. There are no Special Areas of Conservation (SACs), Marine Protection Areas (MPAs), Special Protection Areas (SPAs) or RAMSAR sites within 10 km of the site. There are two areas of Ancient Woodland within 2 km of the site, both located approximately 1.9 km to the North and South-West of the site respectively comprising Birchanger Wood Ancient and Semi-Natural Woodland and Thorley Wood Ancient and Semi-Natural Woodland. There are 10 non-statutory designated Local Wildlife Sites (LWSs) within 2 km of the site, the closest of which is located approximately 200m to the East of the boundary of the wider sewage treatment works site.

A site plan, showing the permitted area of the STC and the wider STW can be found in Appendix A.2 while a process flow diagram summarising the sludge treatment process can be found in Appendix A.5. A site tank inventory is included below, followed by the site process description which identifies where tanks are located within the sludge treatment process.

Table 2.1 Site tank inventory

Tank Purpose	Number	Operational Volume (m^3)	Total Operational Volume (m3)	Construction
Sludge Buffer Tank	1	577	577	Steel
Primary Digester Tanks	2	1,072	2,144	Concrete

Tank Purpose	Number	Operational Volume (m^3)	Total Operational Volume (m3)	Construction
Primary Digester Tank	1	987	987	Steel
Secondary Digester Tanks	2	976	1,952	Concrete
Secondary Digester Tank	1	756	756	Steel
Digested Sludge Buffer Tanks	2	115	230	Steel
Contingency Storage Tanks	4	1,972	7,888	Concrete
Boiler Fuel Oil Tank	1	26,000 litres		Steel
Polymer Silo	1	15 tonnes		Steel

Waste Activities

The STC comprises of imports of waste for biological treatment and two additional waste activities (imports of non-hazardous waste to the head of the works and imports of non-hazardous waste to the cake barns). Biological treatment processes at the installation are for indigenous sludge separated from the UWWTD areas of the site and for treatment processes for imported sludge that arrives at Bishop's Stortford STC, normally by tanker and consists of sludge from other Thames Water sites, which forms a waste activity for the site.

Imports of non-hazardous waste are considered a secondary waste operation to the main listed activity and consist of portable toilet waste along with cess, septic tank and similar sewage derived materials to the head of the works for processing through the UWWTD treatment and of digested sludge to the cake barns. Imports to the Cake Pad are for temporary storage, pending recovery offsite; and are a contingency option primarily that will not be routinely used.

Waste imports to the head of the works consist of an offloading point for permitted imported wastes which can be found close to the inlet of the STW. These wastes are imported by tanker and consist of liquids and associated sludges from domestic and municipal sources that are similar in composition to those materials derived from the sewer network and managed via the UWWTD route. No wastes are imported packaged in other ways than tankers. Access to the offloading points is controlled by the issue of keys by Thames Water to approved contractors only, who have undergone appropriate waste pre-acceptance checks on the material they wish to import. These keys enable the delivery tankers to discharge waste into the works, through a data logger which records the volume of waste transferred.

Bishop's Stortford STW's Cess/Waste Import Point that is located on engineered concrete which is impermeable. The area is bunded by concrete kerbing and connected to drainage which returns to the Works Inlet. All transfers of cess waste are via a site-supplied transfer hose (to prevent misconnections) and connected to a data logger. Waste material discharges into the Works Inlet, combine with the incoming flows and is subject to aerobic treatment via the UWWTD route. The import area is covered by a webcam and provided with kerbing and bollard protection for site equipment.

This application includes a second waste operation at the same site is for the import of non-hazardous treated, dewatered sludge cake from other works for temporary storage pending transfer offsite. All such imports will be subject to appropriate waste pre-acceptance and acceptance checks, prior to import, including checking that the incoming cake complies with the requirements of SUiAR and BAS. The waste stream is the same as that arising from the treatment of sludge within the Bishop's Stortford STC with the same characteristics, composition and eventual end use – application to land. As such, the infrastructure which is acceptable for the site cake is appropriate for the imported material.

Cake is stored on an impermeable surfaced cake pad, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank.

Sludge Processes

Indigenous sludge is drawn off the Primary Settlement Tanks (PSTs) and pumped to the Sludge Buffer Tank via Sludge Screens. The Sludge Buffer Tank is an above ground tank that is of steel construction and located on a concrete base. Sludge is subject to external mixing to prevent settling within the Sludge Buffer Tank. High-level alarms prevent sludge being transferred into Sludge Buffer Tank in the event of the sludge level being too high and the Sludge Buffer Tank is connected to an Odour Control Unit (OCU) for odour abatement.

Sludge is subject to thickening in Sludge Thickening Plant. Dedicated pumps transfer sludge to each belt where a liquid polymer, mixed with final effluent/potable water is used to aid coagulation. Liquor from the belt presses is returned via site drainage and the Return Liquor Pumping Station to the Works Inlet for further treatment via the UWWTD route. Thickened sludge is then pumped via a mostly aboveground sludge line to one of the three Primary Digester Tanks located at the site. The Sludge Thickening Plant are subject to odour abatement via an OCU. The belt thickeners can be bypassed and un-thickened sludge pumped to the Primary Digester Tanks.

Imports of sludge from other sites can also be made to Bishop's Stortford for biological treatment and the sludge is passed through a Sludge Screens to remove rag and inorganic material, which is discharged into a skip for offsite disposal, before the sludge is passed to the Sludge Buffer Tank and mixed with indigenous sludges. Inter-site transfers are accepted via site-supplied transfer hoses and a sludge logger. Access to the sludge logger is via a key fob issued to drivers and the logger records the volume of sludge transferred and the originating site. The import area is located on engineered concrete and is fitted with surface drainage that returns to the Works Inlet.

Digestion Processes

There are three Primary Digester Tanks at Bishop's Stortford STC which are covered with fixed roofs. Two of the Primary Digester Tanks are of concrete construction, and are predominantly aboveground tanks with a shallow conical base. The third Primary Digester Tanks is of steel construction, above ground on a concrete base. The Primary Digester Tanks operate on a continuous basis, receiving batches of sludge that is pumped sequentially into each Primary Digester Tank in turn, with the volume of sludge recorded. Primary Digester Tanks have a normal retention time of approximately 12 days. Each Primary Digester Tank is fitted with dual Pressure Relief Valves (PRVs) and are monitored via the site SCADA system for daily sludge feed volume and sludge temperature. Anti-foam is added, as required from an Intermediate Bulk Container (IBC) to prevent foaming.

Additional heat input is provided to all three Primary Digester Tanks via dedicated heat exchangers which use heat generated on site by either the CHP Engine or by the two auxiliary boilers. Sludge is removed from a low-level within each Primary Digester Tank and pumped to the dedicated heat exchange, which receives hot water from a combination of the CHP Engine and two boilers as required, before the warm sludge is returned to the Primary Digester Tank. Macerators operate in-line of the recirculation system.

After the required duration, digested sludge is transferred from the Primary Digester Tank and gravitates to the Secondary Digester Tanks. Secondary Digester Tanks 1 and 2 are annular tanks located around the base of Primary Digester Tanks 1 and 2 and are aboveground tanks that are of concrete construction. Secondary Digester Tank 3 is aboveground, of steel construction. The normal retention time is approximately 7 days. External mixing is provided in all three Secondary Digester Tanks, which are uncovered. Float switches in each of the Secondary

Digester Tanks monitor the level of fill, and in the event of a high level, would inhibit upstream processes. Secondary Digester Tanks can be manually bypassed as required. From Secondary Digester Tank Number 3, sludge is pumped to two Digested Sludge Buffer Tanks for storage pending dewatering.

Digested sludge is pumped to one of the two Digested Sludge Buffer Tanks, which operate in parallel. These Digested Sludge Buffer Tanks are both of concrete construction, aboveground. The Digested Sludge Buffer Tanks are uncovered, subject to mixing to prevent settling and have high-level floats to monitor the level of sludge within each Digested Sludge Buffer Tank which are connected to the site SCADA. In the event of a high level alarm, sludge transfer pumps are inhibited to prevent over-filling of the Digested Sludge Buffer Tanks. Under normal conditions, pumps transfer digested sludge to the Digested Sludge Dewatering Plant located within the dewatering building.

There are two belt presses which are used for dewatering digested sludge on a duty/standby basis. A polymer coagulant made up with final effluent or portable water is automatically made, using powder polymer in a bulk bag and stored in a day tank prior to dosing to the Digested Sludge Dewatering Plant. Stock polymer is then dosed to the duty belt press. Liquor from the Digested Sludge Dewatering Plant gravitates to a sump and then to the Return Liquor Pumping Station where it is pumped to the Works Inlet for further treatment via the UWWTD route. Digested sludge cake is transferred via covered conveyors and is deposited on the engineered open Cake Pad. Digested sludge is transferred from under each of the conveyor belts and moved by a shovel loader or similar plant to another point on the Cake Pad for storage prior to removal from the site under the Sludge Use in Agriculture Regulations 1989 (SUiAR), and in accordance with the Biosolids Assurance Scheme (BAS). In the event of failure of processing plant, the standby machine will automatically take over operations and the duty machine will be taken out of operation.

The Cake Pad is of engineered concrete with drainage. Gully drainage and surface water drains capture run-off which is returned to the Works Inlet via the site drainage. A site-specific bioaerosol risk assessment for the STC is provided as Appendix F.

Biogas

Biogas produced within the three Primary Digester Tanks is captured and transferred to a double membrane Biogas Storage holder on site. The dual membrane Biogas Storage holder has an inner and outer bag that is fitted with biogas detection systems between the inner and outer bag and Pressure Relief Valves (PRVs) that operate in an emergency as a safety precaution in the event of over pressurising the system. An ultrasonic level is fitted which measures the height of the internal Biogas Storage. Air blowers keep the Biogas Storage holder inflated and exhaust air is monitored by methane detectors to identify any leaks of biogas. The area surrounding the Biogas Storage holder is classified as a potentially explosive atmosphere, fenced off for security, provided with lightening protection and there are strict management provisions on the control of potential ignition sources in accordance with the site DSEAR assessment.

Biogas is transferred in a partially aboveground and partially belowground biogas pipeline that is equipped with condensate pots that capture entrained moisture from the generated biogas and allow it to be drained into the site drainage system for treatment. The partially belowground biogas pipeline is within an inspection chamber to allow for maintenance access. Removing the condensate improves the quality of the biogas and reduces impurities that could reduce the efficiency of the CHP Engine. Biogas is transferred for use in either the CHP Engine, boilers or emergency flare. A slam shut valve is present on the main biogas line that would automatically isolate the Biogas Storage holder in the event of an emergency situation. A siloxane filter is located upstream of the CHP Engine on the biogas line to remove impurities from the biogas prior to combustion in the CHP Engine. Use of siloxane filters reduces incidence of operational issues for the CHP Engine. Biogas also passes through biogas boosters, one on the line to the CHP Engine and boilers, and one on the line to the Emergency Flare.

There is one CHP Engine at Bishop's Stortford, which is a MAN engine with a thermal input of 0.930 MWth. This CHP Engine is located externally within a self-contained unit that is designed for external use. It operates continuously on biogas with no back-up fuel to provide electricity for the site and low-grade heat for the primary digester heat exchange system. Emissions to air from the CHP Engine are via a 2m stack.

The CHP Engine falls outside of the scope of Medium Combustion Plant Directive (MCPD) as it is too small to be considered as 'existing' combustion plant under MCPD as it is below the 1 MW threshold. Specified Generator Controls also do not apply since for all combustion plant there is (i) not a capacity agreement or an agreement to provide a balancing service and the CHP engine is not (ii) part of a specified generator group which in total has a rated thermal input of between 1MWth and less than 50MWth (i.e. the CHP engine is below 1MWth; the standby generator operates as an excluded generator and the boilers are not relevant to the definition).

Low grade heat is supplied from the CHP Engine via a heat exchange to the Primary Digester Tanks and can be supplemented by combustion of either indigenous biogas or fuel oil in dual fuelled auxiliary boilers. There are two boilers, one of which is a one of Strebel model with a thermal input of 0.67 MWth and one of which is a Remeha model with a thermal input of 0.8 MWth that are located within the boiler house. Emissions from the boilers are via two 6 m high stacks. A 26,000-litre capacity double skinned steel diesel tank supplies the boilers in the event of biogas not being available and is located next to the CHP Engine.

In the event of there being excess biogas, i.e. more than the CHP Engine or the boilers can utilise, or in the event that the CHP Engine or boilers are unavailable, there is a ground mounted emergency flare which automatically operates on a high level of biogas within the Biogas Storage holder. This is utilised under 10% of the year, less than 876 hours per year.

There are also Contingency Tanks at Bishop's Stortford STC which are used in an emergency to temporarily store sludge, prior to its export for treatment offsite.

Emergency Standby Generator

The site has one emergency standby generator that is used for emergency purposes only and regular testing which is with its own diesel tank that is suitably bunded. This standby emergency generator is not considered to be a Directly Associated Activity to the STC as it does not meet the criteria under Guidance "Understanding the meaning of regulated facility" RGN2.

BAT Considerations

A BAT gap analysis has been completed for the STC against the associated BAT conclusions and this gap analysis is attached as Appendix D.

2.1 BAT 3; 6; 7: Return Liquors

The site does not have a Liquor Treatment Plant. Liquor treatment for waste waters arising within the permitted area is part of the waste water treatment process of the STW and does not fall within the permit boundary.

There are no direct emissions to water from the STC. The only indirect emissions are of the sludge related liquors, primarily sludge dewatering liquor, and surface (rain) waters, which are returned to the wastewater treatment works for aerobic treatment under Urban Wastewater Treatment Regulations.

Return Liquor Monitoring is included in Appendix M.

2.2 Management of Diffuse Emissions – BAT 14

There are open top tanks within the permit boundary at Bishop's Stortford STC, including the Secondary Digester Tanks, Digested Sludge Buffer Tanks and Contingency Storage Tanks.

Thames Water is committed to meeting the requirement of BAT. A full BAT risk assessment is required to determine the potential need to cover open topped tanks. Thames is not able to commit to covering tanks by the stated deadline of December 2024 delivery timescales will be subject to the outcome of PR24 and subsequent price review discussions.

2.3 Site Infrastructure

Management of emissions to water – BAT 19

Thames Water is committed to meeting the requirements of BAT. A full BAT risk assessment is required to determine the detailed design for Bishop's Stortford secondary containment, the secondary containment options report (see Appendix G) is an outline solution that may be subject to change. Thames is not able to commit to secondary containment requirements by the stated deadline of December 2024 delivery timescales will be subject to the outcome of PR24 and subsequent price review discussions.

A figure showing the current site surfacing within the permit boundary is included within Appendix A, Figure A.3.

Process Controls

Anaerobic digestor operations are monitored automatically from the control centre at the site and outside of normal operational hours, from the regional control centre. Checks include digester health, temperature and operation. As described, tanks are equipped with appropriate high-level alarms and automatic cut off valves to minimise releases. The Primary Digester Tanks and Biogas Storage holder are also fitted with dual pressure relief valves (PRVs) which operate in an emergency to minimise releases from over- or under-pressurisation. Site operations are covered by Thames Water's management system, including the preventative maintenance programme for the site.

A range of process parameters are subject to routine monitoring or checking to ensure that the digestion process is operating optimally so that the required sewage cake output quality is achieved.

- pH: At a conventional digestion site such as Bishop's Stortford the processes is maintained around pH 7 but within the range 6.72 – 7.6 (this is % dry solids and digester load dependant) for healthy operation.
- alkalinity: Levels dependant on feedstock characteristics (primary sludge: Surplus Activated Sludge (SAS) ratio). Conventional digestion typically, 3,500 - 5,000mg/litre range.
- temperature: minimum target of 38°C. This is maintained within the range 36-40°C.
- HRT (hydraulic retention time): minimum target is 15-days, there is no upper limit. Retention times shall not be less than 12-days during plant outages to keep the product pathogen kill efficiency control.
- OLR (organic loading rate): see table below - this is dependent on the primary/SAS ratio. Bishop's Stortford fits into the first row of the table.
- Dry solids feed: see table below, Bishop's Stortford has a target of 6%DS, but this can vary between 3-8%DS and impacts the HRT.

Type of Digestion	0%- 35% SAS[x]	36%- 45% SAS	46%- 50% SAS	51%- 55% SAS	>55% SAS	Max Feed %DS
MAD* in Conventional Digestion	3	2.5	2	1.75	n/a	6
MAD after Pre-pasteurisation	4.5	4	3.5	3	n/a	7
MAD after Acid Hydrolysis	4.5	4	3.5	3	n/a	7
MAD after Thermal Hydrolysis	7	6.5	6	5.5	5.5	14

* mesophilic anaerobic digestion
[X] surplus activated sludge, arising from the UWWTD treatment route.

- VFA (volatile fatty acid) concentration: There is no specific range for VFAs as it depends on the feedstock. It is used as an indicator of digester health rather than a process control. The production of organic acids depends on the volume of solids fed to the digester. The typical range for VFAs in a primary digester is between 50 and 800 mg/L. When VFA concentrations climb above 1000 mg/L, the digester could be overloaded or experiencing other problems.
- Ammonia - Ammonia concentrations of 50 to 1000 mg/L are beneficial, but ammonia levels of 1500 to 3000 mg/L (pH greater than 7.4) could be inhibitory but not always. An ammonia concentration higher than 3000 mg/L for prolonged period is toxic.
- VFA to Alkalinity ratio: Very important parameter to monitor for digestion process. The VFA to alkalinity ratio of below 0.4 is good and above this threshold value means diminishing alkalinity and low pH i.e. sour digester content. As long as this ratio is maintained higher VFA and alkalinity digester content can be acceptable and the digestion process is deemed healthy. Anaerobic digestion process is always controlled based on holistic parameters but not based on single parameter.

Waste Tracking

Because of the nature of the waste accepted at the site for treatment, and the processes undertaken, the location of any specific load of waste cannot be tracked directly within the installation. Instead, tracking, if required, is based on the normal operational periods for treatment, which can locate the approximate location of the imported material with the process, based on the number of days post acceptance.

Cake imports are stored separately on the Cake Pad, and their location can be identified on this basis.

Odour

The facility has an Odour Management Plan which is supplied as Appendix E.

Bioaerosols

Digested sludge cake at Bishop's Stortford is stored on a Cake Pad which is within 250 m of the nearest sensitive receptor, where people live or work for more than 6 hours at a time. See Appendix F for the site specific Bioaerosol Risk Assessment.

Other Items

Please see Appendix A, A.6 for photographs of key plant infrastructure.

A leak detection and repair (LDAR) plan has been prepared for the site and this is presented as Appendix H.

An air dispersion model using ADMS has been prepared for the air emissions from combustion plants at the site and is provided as Appendix L to this application. The key findings are that the impact from the emissions are acceptable.

Other Risk Assessments

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

2.4 Regulatory listing

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

The relevant listing under Schedule 1 is:

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

Part A(1) (b); Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC—

(i) biological treatment.

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

- Imports of waste, including sludge from other sewage treatment works for treatment;
- Blending of indigenous sludges and imported wastes/waste sludge prior to treatment;
- Storage of digestate prior to dewatering;
- Dewatering of digested sewage sludge
- Transfer of dewatering liquors via site drainage back to the head of the sewage treatment works;
- Transfer of surface water runoff via site drainage back to the head of the sewage treatment works;
- Storage of dewatered digested sludge cake prior to offsite recovery;
- Storage of biogas;
- Transfer of biogas condensate via site drainage back to the head of the sewage treatment works;
- Operation of a siloxane filter;
- Combustion of biogas in a biogas CHP Engine and biogas or gas oil in two boilers;
- Operation of an emergency flare;
- Storage of diesel;
- Storage of wastes, including waste oils; and
- Storage of raw materials.

The waste activities at the site are:

- Imports of waste to the works inlet for treatment through the UWWTD route;
- Imports of digested sludge cake for temporary storage pending off-site removal.

In addition to the listed activity at the site, there is directly associated activity of a biogas combustion plant. This comprises:

- 1x 0.93 MWth CHP Engine;
- 2x boilers, one 0.67 MWth boiler and one 0.80 MWth boiler;

Total thermal input of site is approximately 2.7 MWth. The two biogas boilers, whilst DAAs to sludge treatment, do not require permitting as either MCP or SG as they are each less than 1MWth and do not generate electricity.

2.5 Combustion Plant

Information on the CHP engine is given below but note it is too small to be a MCP and does not meet the definition of a specified generator.

Bishop's Stortford CHP Engine (too small to be a mcp)

MCP specific identifier*	Bishop’s Stortford STC CHP Engine 1
12-digit grid reference or latitude/longitude	E : 550046, N : 219743
Rated thermal input (MW) of the MCP	0.93 MWth
Type of MCP (diesel engine, gas turbine, other engine or other MCP)	Other engine
Type of fuels used: gas oil (diesel), natural gas, gaseous fuels other than natural gas	Biogas
Date when the new MCP was first put into operation (DD/MM/YYYY)	2007
Sector of activity of the MCP or the facility in which it is applied (NACE code**)	E37.0.0
Expected number of annual operating hours of the MCP and average load in use	8,760
Where the option of exemption under Article 6(8) is used the operator (as identified on Form A) should sign a declaration here that the MCP will not be operated more than the number of hours referred to in this paragraph	n/a

3. Form B2 Questions

1 About the permit

1a Discussions before your application

The pre-application process is currently not available due to Environment Agency resourcing issues, discussions have been held with the local area Environment Agency staff. Nature and heritage conservation screening was requested and received via email from the pre-application advice service of the Environment Agency.

1b Is the permit for a site or for mobile plant?

No - This application relates to a site.

2 About the site

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

Bishop's Stortford Sludge Treatment Centre

Bishop's Stortford Sewage Treatment Works

Jenkins Lane

Great Hallingbury

Bishop's Stortford

Hertfordshire

CM22 7QL.

NGR TL 50068 19772

2b What type of regulated facility are you applying for?

This application relates to a bespoke waste installation

2c If you are applying for more than one regulated facility on your site, what are their types and their grid references?

This application is for a single regulated facility, namely an installation.

2d Low impact installations (installations only)

2d1 Are any of the regulated facilities low impact installations?

No. This application is not for a low impact installation.

2e Treating batteries

2e1 Are you planning to treat batteries?

No. This application is not for the treatment of batteries.

2f Ship recycling

2f1 Is your activity covered by the Ship Recycling Regulations 2015?

No. This application is not covered by the Ship Recycling Regulations 2015.

2g Multi-operator installation

No. This is not a multi-operator installation.

3 Your ability as an operator

3a Relevant offences

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

Yes. The applicant has been convicted of a relevant offence within the last 12 months.

Event Name	Court	Date of hearing	Fine	Summary
EA v Thames Water Utilities Limited	Lewes Crown Court	3rd & 4th July 2023.	Fine £3,334,000.00 Prosecution Costs: £128,961.05 and victim surcharge of £120.00	Thames Water pleaded guilty to four charges under the Environmental Permitting (England and Wales) Regulations 2016. The detail of each summons is included below: Summons 1: Between 9 October 2017 and 14 October 2017 TW caused a water discharge activity, namely A discharge of sewage effluent from Crawley Sewage Treatment Works into the Gatwick Stream and the River Mole, except under and to the extent authorised by an environmental permit contrary to Regulation 38(1)(a) and Regulation 12(1)(b) of the Environmental Permitting (England and Wales) Regulations 2016. Summons 2: On and /or before 14 October 2017 TW did contravene condition 11 of environmental permit CNTM.1402 by failing to have capacity of not less than 11,000 m3 in the storm lagoon at Crawley Sewage Treatment Works contrary to Regulation 38(2) of the Environmental

Event Name	Court	Date of hearing	Fine	Summary
				Permitting (England and Wales) Regulations 2016. Summons 3: Between 9 October 2017 and 14 October 2017 TW contravened condition 12 of environmental permit CNTM.1402 by failing to discharge when the rate of flow at the inlet sewer at Crawley Sewage Treatment Works is in excess of 840 l/s due to rainfall and /or snowmelt contrary to Regulation 38(2) of the Environmental Permitting (England and Wales) Regulations 2016. Summons 4: On and /or before 14 October 2017 TW did contravene condition 13 of environmental permit CNTM.1402 by failing to empty the storm lagoon at Crawley Sewage Treatment Works and return the contents for full treatment as soon as practicable after cessation of the overflow to the lagoon contrary to Regulation 38(2) of the Environmental Permitting (England and Wales) Regulations 2016.

3b Technical ability

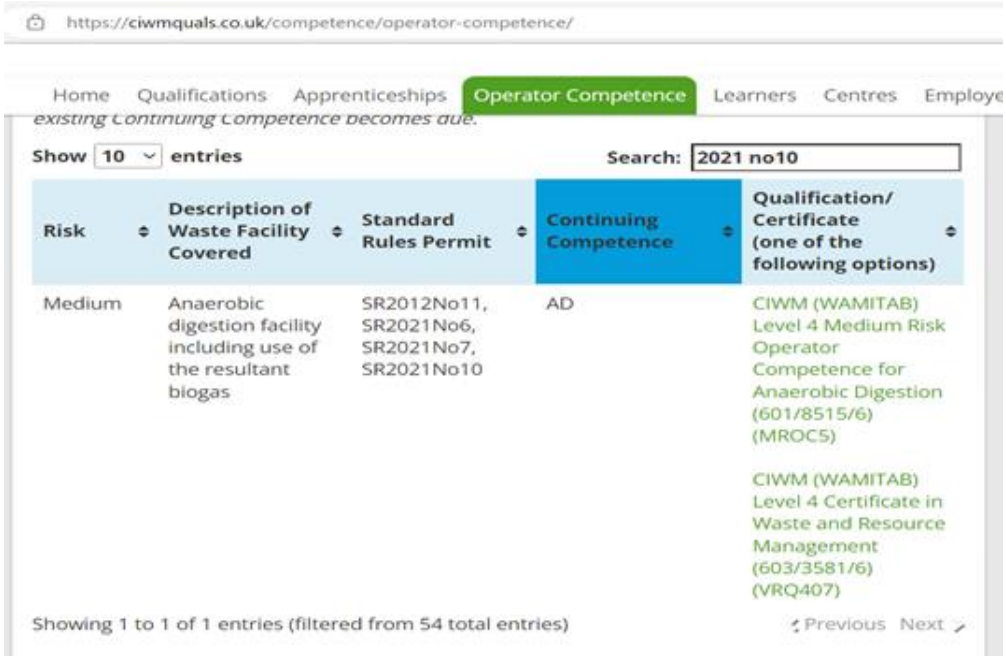
Thames Water uses WAMITAB qualified staff at their waste facilities. The relevant person for the site has been named below and full details have been provided separately on a spreadsheet.

Colin Metivier

Please see Appendix B for evidence of competency

Following original communications with the Environment Agency and CIWM (WAMITAB), Thames Water understands there are two routes to holding an appropriate CoTC for the permit as laid out in the screen shot below:

a) CIWM (WAMITAB) Level 4 medium risk operator competence for anaerobic digestion (MROC5)
b) CIWM (WAMITAB) Level 4 Certificate In waste and Resource Management – VRQ" and optional "VRQ407 – Principles and practices of managing a biological treatment processing facility (Anaerobic Digestion and Composting)"



Thames intend to follow Option B at this site.

Thames Water understands from the CIWM website that the proposed option is acceptable.

3c Finances

Installations, waste operations and mining waste operations only.

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

No.

3d Management systems

What management system will you provide for your regulated facility?

Identify the form of the management system from the list:

• Own management system

Thames Water has a SharePoint based Environmental Management System, with site specific elements and procedures linked from across the organisation Thames Water also has an Asset Management System accredited to ISO 55001 and an Energy Management System accredited to ISO 50001.

Scope

Thames Water has an EMS in place for its permitted assets.

Environmental Policy

Implementation of Thames Water's Environmental Policy is approved by the Thames Water Executive Committee of the Thames Water Board and is the responsibility of all employees, with the Chief Executive being accountable for its implementation. The policy covers all company activities, including this installation, and applies to all individuals who are employed by, or carry out work on behalf of, any Thames Water company including contractors,

temporary staff and agency workers. The Management Systems Team is responsible for the implementation and assurance of the EMS, the site operations teams will be responsible for maintaining ongoing compliance with the EMS and managing the site.

Management and Responsibilities

The Management Systems Team (EMS specialists) have 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 Environmental Assurance Team maintain a Legal Register and, in consultation with Operations Teams, the environmental permitting team 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 consider legal and other requirements, cost to the business, scale of impact and interested parties.

Management Systems Team are responsible for setting internal environmental standards which are then implemented by the relevant business areas. The Standards and other relevant information are communicated through several routes. Incident and corrective action routes exist to promote continual improvement. The team run a programme of Management System Audits to determined adherence to the environmental policy and environmental standards.

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

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

Operational Control

Procedures are in place within the EMS to identify and control environmental issues arising from company activities. Each department is required to achieve operational control of its activities using standardised systems.

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

Non-routine activities, such as major overhauls/refurbishments, which involve the use of sub-contractors are assessed for health & safety concerns; relevant environmental risks and with accompanying method statements to respond to these. Contractors who are required to carry out major services are closely managed by operational or other staff to ensure that compliance with Thames Water's H&S and environmental policies is achieved. No contractors may work on site without having undergone a full site induction and being issued with a Thames Water Operational Safety Authorisation (TWOSA) for the task(s) they intend to complete.

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

Maintenance and Monitoring

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

- Daily operation of plant (24/7) involves visual inspection of operational assets;
- Daily inspection of temporary pipe work installed;
- Routine maintenance programme for plant; and
- Routine lubrication programme.

Personnel responsible for the inspection, testing and maintenance of pollution prevention infrastructure are trained to an appropriate level.

All regular maintenance of all plant and equipment will be completed on the time scale specified by the equipment manufacturer including routine inspections.

Environmental Improvement

Thames 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. TWUL's Environmental Governance Board meets on a regular basis to provide strategic direction, and interrogative review, attached to any environmental issue of substantive concern including emerging risks as well as current topics.

Competence, Training and Training Records

Thames 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.

For those sites treating 'waste' as defined by the Waste Regulations 2011, coverage at all permitted sites by staff who hold the appropriate level of WAMITAB 'Certificate of technical Competence' is monitored centrally. This aspect of the staff training is currently being reviewed in light of the change in permitting requirements for sludge treatment centres.

For each internal training course held a Training Record is issued.

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

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

Contractors

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

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

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

Incidents, Non-Compliances and Complaints

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

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

Customer complaints are made via the Customer Services Centre which will log all complaints electronically. An action is raised to Waste Operations Control Centre (WOCC) who contact the CSM by telephone and email the complaint information to both the CSM and Performance Manager. The CSM and Performance Manager will review the complaint and take action to investigate the complaint. The CSM is responsible for contacting the customer and updating them on the outcome of the investigation and any actions taken. Where complaints relate to odour/noise/amenity, typical follow up action would include physical checks onsite of the operation of plant; offsite checks where needed; with all the actions taken being logged. Where appropriate, site management may contact the customer to discuss the outcome of the complaint, otherwise, there is a customer communication plan that identifies how and when contact will be made with customers and other stakeholders.

Information regarding complaints is recorded to allow determination of an appropriate response (corrective action) and identify what measures need to be taken in the future to prevent its reoccurrence (preventive action).

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: toolbox talks, environmental alerts, OSC portal forums, formalised event learning processes following an operational incident and compliance audits.

4 Consultation

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

4a A sewer managed by a sewerage undertaker?

Yes. The site discharges into a drainage system of the wider sewage treatment works, controlled and operated by the applicant.

4b A harbour managed by a harbour authority?

No.

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

No.

4d Is the installation on a site for which:

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

No.

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

No.

5 Supporting information

5a Provide a plan or plans for the site

Please see Appendix A:

- A.1 Site location plan.
- A.2 Installation Boundary and Air Emission Points.
- A.3 Site Impermeable and Permeable Surface Plan.
- A.4 Site Drainage Plan.
- A.5 Process Flow Diagram.
- A.6 Site Photographs.

5b Provide the relevant sections of a site condition/baseline report if this applies

See Appendix C (document: TW_STC_EPR_20a_BSD_APPC) for the Site Condition Report.

5c Provide a non-technical summary of your application

Please see earlier text in Section 1.

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

No. The site processes sit outside the scope of the Environment Agency fire prevention plan guidance, as set out in the Environment Agency guidance.

6 Environmental risk assessment

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

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

Designated Site Review

Site Name	Designation	Direction from site	Distance from site
Thorley Flood Pound	SSSI	South-West	1400 m
Flitch Way	LNR	North East	1900 m
n/a	RAMSAR		
n/a	SAC		
n/a	SPA		
n/a	MPA		
Birchanger Wood	Ancient and Semi-Natural Woodland	North	1900 m
Thorley Wood	Ancient and Semi-Natural Woodland	South-west	1900 m
List of Local Wildlife Sites			
Wallbury Plantation and Marsh Rushy Mead Woodside Green Twyfordbury Gravel Pit East Thorley Washes Bishop's Stortford Cemetery Thorley Wood Thorley Wash Meadow South Woodland by Raynham Road Flitch Way			All sites within 2,000 m

Data taken from MAGIC.gov.uk website, accessed January 2022. For habitat sites, the relevant distance for consideration are: International designations (SAC, MPA, SPA and Ramsar - 10km); National designations (SSSI – 2km); Local and National Nature Reserves, Local Wildlife Sites (LWS) and Ancient Woodland (AW) (2km).

There are two statutory designated habitat sites within the relevant distances of the site. The closest is Thorley Flood Pound SSSI, which is 1.4 km South-West of the site. There are two further SSSI designations (Hatfield Forest and Little Hallingbury Marsh) and a NNR (Hatfield Forest) located to the South-East, East and South-West at distances of 2.3km and 2.6km respectively. There are no SAC, MPA, SPA or RAMSAR sites within 10 km of the site.

The closest designated Local Nature Reserve (LNR) to the site is Flitch Way LNR located to the North-East of the site, at a distance of 1.9 km.

There are two areas of Ancient Woodland within 2 km of the site, both located approximately 1.9 km to the North and South-West of the site respectively comprising Birchanger Wood Ancient and Semi-Natural Woodland and Thorley Wood Ancient and Semi-Natural Woodland.

There are 10 non-statutory designated LWS's within 2 km of the site, the closest of which is located approximately 200m to the East of the boundary of the wider sewage treatment works site.

The site sits outside the boundaries of a source protection zone (SPZ).

The site is located within a flood zone 1 area with a low probability of flooding (>1:1000 annual probability of flooding).

The site is not located within or adjacent to the boundaries of an Air Quality Management Area (AQMA). The nearest AQMA is located approximately 1.3km to the North-West of the site within the settlement of Bishop's Stortford and is referred to as the Bishop's Stortford AQMA, which has been declared for Nitrogen Dioxide (NO_2) – Annual Mean.

The site is also not located within or adjacent to the boundaries of Noise Important Area (IA) for roads or railways. The nearest Noise IA is located approximately 1.2km to the North-West of the site within the settlement of Bishop's Stortford.

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
Amenity issues: Litter, vermin and pests	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, amenity and recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. The site is located in a rural area except for two dwellings that are close to the site entrance. The nearest residential dwellings are located on the site's northern boundary consisting of light commercial units and a residential property. A further residence and leisure facility is 200 m to the north-east. The site is approximately 600 m south and east of the Bishop's Stortford conurbation. The M11 motorway is approximately 300 m to the east of the site. Ecological receptors: There is one SSSI within 2km of the site, namely Thorley Flood Pound which is approx. 1.4 km south-west of the site. There is also one LNR which is 1.9 km to the north-east, Flitch Way LNR. In addition, there are 10 LWS and 2 areas of Ancient Woodland within 2 km of the site, of which the closest is an LWS approx. 200 m to the east. There are no SACs, MPAs, SPAs or Ramsar sites within 10km of site.	The wastes handled at the site are primarily liquids and sludges, along with UWWTD derived material delivered by sewer. As such, there is no source of litter within the materials handled at the site. In the unlikely event pests or vermin are observed on site a suitable contractor is called in as soon as practicable.	X
Dust and bioaerosols	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Litter above. The impact of dust on human health will depend on the distance and wind direction. For bioaerosols, the distance is 250 m.	The wastes handled at the site are liquids, sewage sludges and digested sludge cake, along with UWWTD derived material delivered by sewer. The site will not be handling inherently dusty or powdery wastes. Digested sludge cake retains a high moisture content and is not dusty and the Cake Pad is located on the southern side of the site, away from nearby receptors. The nearest receptors are commercial and residential buildings approx. 220 m to the north. Roads will be maintained to avoid the production of dust. Anaerobic digestion of sludge takes place within a closed system. Digested sludge cake is stored on the Cake Pad which is less than 250 m away from sensitive receptors who may be present for more than 6 hours, however, the risk from bioaerosols has been assessed to be low.	✓

		Please see Appendix F for the site specific bioaerosol risk assessment (document: TW_STC_EPR_20a_BSD_APPF).	
Assessment of point source emissions to air Emissions deposited from air to land	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Amenity issues above. The impact of emissions from air on human health will depend on the distance and wind direction.	The site is not located within an AQMA. ADMS modelling indicates impact from the emissions are acceptable. Full details can be found in Appendix L (document: TW_STC_EPR_20a_BSD_APPL). Use of the emergency flare is limited to emergency situations and during planned maintenance activities to either the CHP Engine or boilers. Use of the flare is recorded. Pressure relief valves are not used routinely to control biogas volumes and would only operate in an emergency. Fugitive emissions to air are assessed in Table B3-3b(i).	X
Assessment of point source and fugitive emissions to water	The River Stort is located 300 m west of the wider sewage treatment works site boundary and the Great Hallingbury Brook is 130 m south-east of the site boundary. The wider STW is entirely within Flood Zone 1. The newly permitted sewage treatment activities are fully located within Flood Zone 1 with a low probability of river flooding. Surface water drainage within the site is returned to the inlet mixing chamber of the sewage treatment works for full treatment prior to discharge.	The main product of the process is a digested sludge cake, which is stored within Flood Zone 1, on an area of concrete hardstanding that is equipped with drainage. Other aqueous discharges generated by process are limited (comprising biogas condensate, dewatering liquors and surface water run off). These sources are discharged to the on-site drainage system where they are transferred to main sewage works inlet. Due to the nature and small quantity of these emissions no further assessment of point source emissions is deemed necessary.	X
Assessment of odour	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Amenity issues above. The impact of emissions from odour on human receptors will depend on the distance and wind direction.	The wider STW which includes the area of the STC to be permitted has processes in place to minimise odour which includes management systems, physical abatement, procedures and monitoring to control fugitive emissions of odour at the plant. Odour from the STC cannot be considered in isolation from the wider works. The STW has an Odour Management Plan, which is appended as Appendix E (document: TW_STC_EPR_20a_BSD_APPF). Odour emissions are assessed in Table B3-3b(ii).	X

Energy	Global atmosphere (direct and indirect emissions)	Use of biogas on site within the CHP engine and/or boilers minimises the need to import non-renewable electricity and gas from the National Grids. Good maintenance procedures will help the plant run efficiently and reduce site energy consumption. Use of LED lighting reduces site consumption	**X**
Land and disposal of waste to other processes	Rivers and streams – see Assessment of point source and fugitive emissions to water above. Drainage systems/sewers. The site lies outside any Groundwater Source Protection Zones (SPZ). Aquifers are classified as Secondary A (bedrock) and Secondary (undifferentiated) (superficial deposits).	All waste streams are disposed of off-site for recovery or disposal and will continue to be transferred (and consigned where hazardous) to appropriately permitted facilities.	**X**
Noise and vibration	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, amenity and recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. The site is located in a rural area except for two dwellings that are close to the site entrance. The nearest residential dwellings are located on the site's northern boundary consisting of light commercial units and a residential property. A further residence and leisure facility is 200 m to the north-east. The site is approximately 600 m south and east of the Bishop's Stortford conurbation. The M11 motorway is approximately 300 m to the east of the site. Ecological receptors: There is one SSSI within 2km of the site, namely Thorley Flood Pound which is approx. 1.4 km south-west of the site. There is also one LNR which is 1.9 km to the north-east, Flitch Way LNR. In addition, there are 10 LWS and 2 areas of Ancient Woodland within 2 km of the site, of which the closest is an LWS approx. 200 m to the east. There are no SACs, MPAs, SPAs or Ramsar sites within 10km of site.	Site design has been chosen to minimise the impact of noise on offsite receptors through building orientation, finishes and location of openings. Combustion plant is located within buildings and away from nearby receptors. Noise from plant and equipment will be minimised through purchasing decisions and a robust preventative maintenance programme There will be no sources of vibration within the facility. Noise and vibration emissions are assessed in Table B3-3b(iii).	**X**
Other issues (including visual impact)	Protected species and habitats	There are protected species (Code 2) identified within the specified screening distance of the site (up to 500m). There are no protected habitats identified within the specified screening distance of the site (up to 500m).	**X**

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

Appendix 2 – Date of birth information for Relevant offences and/or Technical ability questions only

This information has been supplied separately for the ease of exclusion from the public register

4. Form B3 Questions

1 – What activities are you applying to vary?

Table B3-1a – Types of activities

Installation name	Schedule 1 references	Description of the Activity	Activity Capacity	Annex I and II codes and descriptions	Non-hazardous waste treatment capacity
Bishop's Stortford Sewage Treatment Works AR1	S5.4 A1 (b) (i) Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving biological treatment Anaerobic digestion of permitted waste in six Primary and Secondary Digester Tanks followed by combustion of biogas produced from the process	From receipt of permitted waste through to digestion and recovery of by-products (digestate and biogas).	242 wet tonnes per day (throughput based on 2,900 m3 / 12 days = 242 m3 per day)	R1 Use principally as a fuel or other means to generate energy R3: Recycling reclamation of organic substances which are not used as solvents R13 Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced) D15: Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where it is produced	Maximum waste throughput 270,000 wet tonnes per annum including indigenous UWWTD derived sludge from within the wider Sewage Treatment Works. As per volume calculations in Note 1 below.
Directly Associated Activities					
AR2	Imports of waste, including sludge from other sewage treatment works for treatment				
AR3	Blending of indigenous sludges and imported wastes/waste sludge prior to treatment				
AR4	Storage of digestate prior to dewatering				
AR5	Dewatering of digested sewage sludge				
AR6	Transfer of dewatering liquors via site drainage back to the head of the sewage treatment works				
AR7	Transfer of surface water runoff via site drainage back to the head of the sewage treatment works				

AR8	Storage of dewatered digested sludge cake prior to offsite recovery
AR9	Storage of biogas
AR10	Transfer of biogas condensate via site drainage back to the head of the sewage treatment works
AR11	Operation of a siloxane filter
AR12	Combustion of biogas in a biogas CHP Engine and biogas or gas oil in two boilers
AR13	Operation of an emergency flare
AR14	Storage of diesel
AR15	Storage of wastes, including waste oils
AR16	Storage of raw materials

Waste Operations				
	Description of the waste operation	**Annex I (D codes) and Annex II (R codes) and descriptions**	**Hazardous waste treatment capacity**	**Non-hazardous waste treatment capacity**
AR17	Imports of wastes: to the works inlet for treatment through the UWWTD route	D13: Blending or mixing prior to submission to any of the operations numbered D1 to D12	n/a	Maximum waste throughput 25,000 wet tonnes per annum
	Digested sludge cake for temporary storage pending off-site removal	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). R3: Recycling or reclamation of organic substances which are not used as solvents	n/a	Maximum waste throughput 500 wet tonnes per annum
For all Waste Operations		**Total capacity**	**15,534**	**[a] + [b]**

	Total STC treatment capacity (tank volume)	14,534 wet tonnes	[a]
	Total cake pad storage capacity	1,000 wet tonnes	[b]
For waste imports to the head of the works	Annual throughput (tonnes each year)	Imports: 25,000 tonnes	
For waste imports of digested sludge cake for temporary storage	Annual throughput (tonnes each year)	Imports: 500 tonnes	
Note 1: Import Calculations based on: Un-thickened Co-settle: 8.05 tds/day; worse case 2.50% dry solids = 322 m^3/day = 117,572 m^3/year Imports 3.45 tds/day; worse case 1.00% dry solids = 345 m^3/day = 125,970 m^3/year Total Combined import calculation 243,542 m^3/year; rounded to 270,000 m^3/year			

Table 1b Types of waste accepted

Table B3-1b(i): Waste accepted for Anerobic Digestion

Waste Code	Description of Waste
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)
19 06 06	digestate from anaerobic treatment of animal and vegetable waste (sewage sludge only)
19 08 05	sludges from treatment of urban wastewater
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 (sewage sludge only)

Table B3-1b(ii): Waste accepted at the head of the works import point

Waste Code	Description of Waste
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01 [note 1]
Note 1: comprising but not limited to: Thickening and dewatering liquors, centrate and filtrate derived from TWUL processes Waste from a portable toilet	

Table B3-1b(iii): Waste accepted for temporary storage and transfer off-site

Waste Code	Description of Waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste (sewage sludge only)

1c Recovery of hazardous waste on land

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

No - Where the answer is no, there is no requirement to answer further questions in 1c.

2 – Point source emissions to air, water and land

Table B3-2a – Emissions to Air

Emission point reference and location	**Source**	**Parameter**	**Limit**	**Unit**	Reference Period	Monitoring Frequency	**Monitoring standard or method**
A1	CHP Engine 1 (Below threshold for an existing MCP which is an engine fuelled on biogas) [Note 1]	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	-	mg/m^3	-	-	-
		Carbon Monoxide	-	mg/m^3	-	-	-
A2	Auxiliary Boiler 1 (dual fuel)	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	No limit set	-	-	-	-
		Carbon Monoxide	No limit set	-	-	-	-
A3	Auxiliary Boiler 2 (dual fuel)	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	No limit set	-	-	-	-
		Carbon Monoxide	No limit set	-	-	-	-
A4	Emergency Flare [Note 2] [Note 3]	-	-	-	-	-	-
A5	Primary Digester PRV	-	-	-	-	-	-
A6	Primary Digester PRV	-	-	-	-	-	-
A7	Primary Digester PRV	-	-	-	-	-	-
A8	Biogas Storage PRV	-	-	-	-	-	-
A9	OCU 1	Hydrogen Sulphide	-	No limit set	-	Average over sampling period	Once every 6 months
		Ammonia	-	20	mg/m^3		

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). The measurement uncertainty specified in LFTGN08 v2 2010 shall apply.

Note 2: 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). The measurement uncertainty specified in LFTGN05 v2 2010 shall apply.

Note 3: Monitoring to be undertaken in the even the emergency flare has been operational for more than 10 per cent of a year (876 hours).

Table B3-2b – Liquor Transfers to Sewer

Emission point reference and location	Source	Parameter	Limit [note b]	Unit
T1 on site plan(NGR: TL 50049 19811)	Sludge Thickening Liquor, OCU Waste Water, Digested Sludge Dewatering Liquors, Biogas Condensate, Surface Water Run Off	No parameters set	No limit set	-
T2 on site plan (NGR: TL 50085 19658)	Surface Water Run Off	No parameters set	No limit set	-
T3 on site plan (NGR: TL 50041 19806)	Head of Works Import	No parameters set	No limit set	-

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

3 – Operating techniques

3a – Technical standards

Description of the schedule 1 activity or directly associated activity	Relevant technical guidance note or Best available techniques as described in BAT conclusions under IED	Document Reference
Anaerobic Digestion plant S5.4A1(b)(i); Storage of waste (DAA)	BAT Conclusions for Waste Treatment Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (notified under document C(2018) 5070) (Text with EEA relevance.)	

3b - General requirements

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

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

Risk Matrix and Terminology for Accident for Risk Assessment

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

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

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

Table B3-3b(i) Fugitive emissions risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Emissions to air of NOx, SO_2, CO_2 and VOCs	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors	High	Low	Medium	Activities are managed and operated in accordance with the site management system (including inspection and maintenance of equipment, including engine management systems), point source emissions to air (CHP Engine, boilers and emergency flare stack) will have emission limits. Flare stack height of approx. 3 m, CHP Engine stack height is approx. 3m and boiler flues approx. 6 m each (exiting through boiler house roof). Site has a siloxane filter fitted on the main biogas pipeline connected to the CHP Engine to remove impurities within the biogas. ADMS modelling indicates impact from the emissions are acceptable.	Tbc
Biogas transfer systems, Biogas Storage, CHP engine, flare or PRVs failure causing emissions of biogas	Abnormal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global warming potential. Risk of fire and explosion	Low	Medium	Low	The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge. The biogas system utilised is subject to regular preventative maintenance, including a LDAR plan, to minimise the potential for leaks	Low

						occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected. Personnel on site wear portable biogas detectors in order to alert staff to presence of biogas. A flare stack (emergency flare) is utilised for the safe disposal of surplus biogas in the event of plant breakdown, or a surplus of biogas above the level that can be safely stored or utilised. Use of emergency flare is recorded. PRVs are in place on the Biogas Storage holder to be operated in the event of failure of the emergency flare to prevent over pressurisation and catastrophic failure. PRVs are monitored by site staff and re-seated/repaired in the event of activation to minimise the emissions to air.	
Catastrophic loss of biogas emissions from biogas transfer systems, biogas storage, CHP engine, flare or PRVs	Abnormal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global warming potential. Risk of significant fire and explosion	Low	High	Medium	The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge. The biogas system utilised is subject to regular preventative maintenance, including a LDAR plan, to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected.	Medium

						Personnel on site wear portable biogas detectors in order to alert staff to presence of biogas. A flare stack (emergency flare) is utilised for the safe disposal of surplus biogas in the event of plant breakdown, or a surplus of biogas above the level that can be safely stored or utilised. Use of emergency flare is recorded. PRVs are in place on the Biogas Storage holder to be operated in the event of failure of the emergency flare to prevent over pressurisation and catastrophic failure.	
Combustion of biogas within CHP engine and emergency flare. Combustion of biogas or diesel within boilers	Normal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Global warming potential	High	Low	Medium	Combustion plant is regularly maintained and appropriately sized to manage volumes of biogas. Combustion plant operates within permitted ELVs subject to routine monitoring against permit compliance. CHP Engine stack, boiler flues and emergency flare are located centrally, approx. 160 m from the nearest sensitive receptors, which can be found towards the north.	Low
Release of bioaerosols and dust	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors. Odour impact of bioaerosols. Nuisance impact of dust.	High	Low	Medium	The risk of bioaerosol and dust is as a result of digested sludge cake storage within an open engineered Cake Pad. The Cake Pad is located towards the south of the site, away from sensitive receptors. The nearest sensitive receptors are approx. 220 m to north of the Cake Pad.	Low

						Digested sludge cake on the pad retains a high moisture content and is not prone to windblown dispersion leading to the generation of dust. Roads are made from concrete/asphalt and not prone to the generation of dust.	
Release of bioaerosols and dust from spillages	Abnormal	Emissions to air and dispersion leading to inhalation by local human and animal receptors with potential harm to health. Odour impact of bioaerosols. Nuisance impact of dust.	Low	Low	Low	Staff responsible for site housekeeping and cleaning of spillages in a timely manner. Sludge retains a high moisture content and is not prone to windblown dispersion which could cause the generation of dust in the event of a spillage. Internal site roads are made from concrete/asphalt and not prone to the generation of dust.	Low
Spillage of liquids, including chemicals and oils.	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality Emissions to ground and ground water.	Low	Medium	Low	The closest surface water body, the Great Hallingbury Brook, can be found on the STW perimeter and approx. 220 m south of Cake Pad. The site is located outside of a Groundwater Source Protection Zone (SPZ). Chemicals and oils all stored within suitably bunded tanks and IBCs with rainwater removed as required to maintain 110% capacities. Handling and use of chemicals and oils is carried out by trained personnel. COSHH data sheets available.	Low

						Spill kits available on site. Staff are trained in their use.	
Spillage from storage and digestion tanks, overtopping of tanks, leakage from same tanks and from buried pipes	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality Emissions to ground and ground water.	Low	Low	Low	The site is located outside of a Groundwater Source Protection Zone (SPZ). The closest surface water body, the Great Hallingbury Brook, can be found on the STW perimeter and approx. 220 m south of Cake Pad. Provision of suitable structurally integral tanks constructed from steel and glass reinforced plastic or concrete. All tanks are subject to asset inspection and proactive maintenance programme including regular visual inspection for cracks or weeping. Visual checks during regular day-to-day operations and scheduled preventative maintenance of equipment, such as pumps, pipes, joins etc. Biogas condensate discharged back to the works inlet through site drainage system. Spill kits available on site. Staff are trained in their use. There are no point source emissions to water with drainage system pumping back to works inlet.	Low
Generation of solid waste resulting in litter	Normal	Releases of litter to the environment. Visual	Low	Low	Low	Site operations do not give rise to large amounts of solid wastes and litter that would be prone to dispersion by wind. Rags are	Low

		nuisance and local loss of amenity				stored within skips and retain high moisture content. Waste is stored securely for collection by appropriately licensed approved contractors. Litter picking activities are completed as required.	

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

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

Table B3-3b(ii) Odour risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
H2S/biogas emissions from uncovered tanks	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	High	Low	Medium	Biogas will principally be generated in primary digestion tanks which are covered with fixed roofs. The nearest receptors are approx. 130 m to the north of the Primary Digester Tanks. Biogas is also generated in smaller quantities within Secondary Digester Tanks, which are uncovered tanks. The nearest Secondary Digester Tanks are also approx. 130 m from the nearest sensitive receptors. H_2S production is controlled through the digestion process which can be manually overridden if required.	Low

Loss of containment from biogas holders and biogas pipework	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Medium	Low	Biogas is principally stored within the double membrane Biogas Storage holder which is suitably sized to manage biogas generation. The biogas system utilised is subject to regular preventative maintenance, including a LDAR plan, to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected. The biogas pipelines are partially aboveground. Personnel on site wear portable biogas detectors in order to alert staff to presence of biogas. Physical protection measures in place around the digester/Biogas Storage holders, including lightning protection and pipework is guarded. PRVs present on the Biogas Storage holder to safely manage biogas pressures and prevent under or over pressurization. PRVs are monitored by site staff and re-seated/repaired in the event of activation to minimise the emissions to air.	Low
Activation of biogas pressure relief valve	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	PRVs are only activated in emergency situations to maintain safety within the biogas system and are re-seated/repaired promptly to minimize biogas emissions. PRV subject to monitoring via visual checks by site personnel.	Low

						Biogas is principally stored within the double membrane Biogas Storage holder which is suitably sized to manage biogas generation. Site has multiple outlets to use biogas - one CHP Engine, two boilers and one emergency flare which are used in order of preference to maximise recovery of energy. CHP Engine and boilers are subject to regular maintenance to maintain maximum use of outlets, with flare maintained in good working order should it need to be used. The nearest receptor is approx. 125 m north of the Biogas Storage holder.	
H2S/biogas emitted when biogas cannot be combusted in engine, boilers or flare	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	Biogas is principally stored within the double membrane Biogas Storage holder which is suitably sized to manage biogas generation and act as buffer storage when biogas cannot be combusted. Site has one CHP Engine, two boilers and one emergency flare giving multiple outlets for biogas. The nearest receptors are approx. 125 m north of the Biogas Storage holder. The CHP Engine is subject to regular maintenance to maintain maximum use of outlets, with the emergency flare maintained in good working order should they need to be used.	Low

Storage of treated digested sludge cake	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	High	Low	Medium	Digested sludge cake is stored on open, engineered Cake Pads towards the south of the site. The nearest sensitive receptor to the Cake Pad is a domestic and commercial property approx. 220 m to the north. Should any odorous sludge cake be produced, this will be subject to process checks undertaken to identify root cause of production and removed from site expediently.	Low
Failure of odour control units	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	High	Medium	The Odour Control Unit is subject to regular preventative maintenance. Media is replaced inline with the manufacturer's recommendations	Low
Storage of site generated wastes	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	Wastes generated on site are not inherently odorous and is stored securely for collection by appropriately licensed approved contractors.	Low

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

The installation has the potential to generate noise as a result of the permitted activities. Potentially noisy activities are subject to a number of process controls and noise management is a key operational objective, as summarised in the risk assessment table below.

Table B3-3b(iii)Noise risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Operation of CHP Engine	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	The CHP Engine is acoustically baffled, self-contained and designed for external applications therefore noise emissions are already low. The CHP Engine is located in the centre of the site, away from sensitive receptors, with the nearest receptors approx. 175 m north of the CHP Engine. Good inspection regimes and maintenance of plant to ensure that excessive noise levels are not generated. Regular checks of noise mitigation measures fitted to items of plant. Such measures include silencers and baffles fitted to specific areas of plant. Where repair or replacement is required, the plant will, where possible, be taken out of service until repair or replacement of parts has been undertaken.	Low
Operation of fans on air cooled radiators	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	Air cooled radiators do not give rise to high levels of noise and are only used as required. They are located approx. 175 m from the nearest sensitive receptors. Good maintenance of fans to ensure that excessive noise levels are not generated. Where repair or replacement is required, this will be completed promptly.	Low

Operation of site vehicles	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.	High	Low	Medium	Vehicle movements across the site subject to speed limit and subject to partial one-way system to reduce generation of noise. Shovel loading of digested sludge cake takes place on the open, engineered pad during daytime hours only. Nearest receptors to the Cake Pad are shielded by the buildings and structures situated between the Cake Pad and receptor.	Low
Vehicle movements - tanker deliveries of waste sludge and bulk collections of digested sludge cake	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.	High	Low	Medium	Imports are limited to daytime hours only to points within the centre of the site, away from sensitive receptors. Cess import point is approx. 110 m from the nearest sensitive receptor, sludge imports approx. 170 m from the same receptor, which is located towards the north. The impact of generated noise is reduced by the attenuation provided by buildings and tanks within the site. Vehicle movements across the site subject to speed limit and partial one-way system to reduce generation of noise. Shovel loading of digested sludge cake takes place on an open Cake Pad. The nearest sensitive receptor to the Cake Pad is approx. 220 m to the north but are shielded by the buildings and structures situated between the Cake Pad and receptor.	Low
Vehicle movements - tanker deliveries	Normal	Generation of noise with air transportation, causing loss	High	Low	Medium	Deliveries likely to take place during daytime hours to dedicated delivery areas.	Low

of chemicals and raw materials		of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.				Vehicle movements across the site subject to speed limit and partial one-way system to reduce generation of noise.	
Operation of emergency flare	Abnormal	Generation of noise with air transportation, causing loss of amenity to local human receptors.	High	Low	Medium	Emergency flare is located away from sensitive receptors, approx. 220 m from the nearest sensitive receptors which are found north of the flare. Use of the emergency flare is minimized by prioritizing use of the CHP Engine and boilers. Use of the flare recorded.	Low

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

A site specific Accident Management Plan (AMP) is located in Appendix J.

Table B3-3b (v) - Bioaerosol Risk Assessment

The installation has the potential to generate bioaerosols which may pose a risk to nearby sensitive receptors. As summarised in the site specific bioaerosol risk assessment (BRA) which is located in Appendix F:

3c - Types and amounts of raw materials

Table B3-3c – Types and amounts of raw materials

Type and amounts of raw materials used by the installation are summarised in the site specific Residue Management Plan (RMP) which is located in Appendix I.

4 - Monitoring

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

The air emission points A1-A4 are to be monitored in accordance with EA guidance.

Hours of operation of the flare (A4) are monitored and logged. In the unlikely event that the total annual hours of operation exceed 10% of the hours in a year (876 hours), emissions from the flare would be subject to monitoring in accordance with EA guidance.

Point A9 (OCU 1) will be subject to bi-annual testing.

There is no routine monitoring proposed for points A5 – A8 (PRVs)

Table B3-4a- Emissions Monitoring

Monitoring point	NGR	Monitoring frequency	Methodology (standard)	Assessment procedures
A1 (CHP Engine 1)	TL 50046 19743	Oxides of Nitrogen (NO and NO_2 expressed as NO_2) – Annually Sulphur Dioxide – Annually Carbon Monoxide – Annually	In accordance with Environment Agency guidance note M2 "Monitoring of stack emissions to air".	
A2 (Auxiliary Boiler 1)	TL 50051 19766	No limit set	-	-
A3 (Auxiliary Boiler 2)	TL 50054 19762	No limit set	-	-
A4 (Emergency Flare)	TL 50019 19694	Hours of operation – continuous and if over 876 hours then: Oxides of Nitrogen –Annual Carbon Monoxide –Annual Total VOCs - Annual	In accordance with Environment Agency guidance note M2 "Monitoring of stack emissions to air".	
A5 (Primary Digester PRV)	TL 50071 19751	n/a	n/a	-
A6 (Primary Digester PRV)	TL 50045 19786	n/a	n/a	-
A7 (Primary Digester PRV)	TL 50018 19768	n/a	n/a	-
A8 (Biogas Holder PRV)	TL 50003 19783	n/a	n/a	-
A9 (OCU 1)	TL 50135 19800	Hydrogen sulphide Once every six months	CEN TS 13649 for sampling NIOSH 6013 for analysis OR US EPA M11	
		Ammonia: Once every six months	EN ISO 21877 OR CEN TS 1369 for sampling NIOSH 6016 for analysis	
S1 (Liquor sampling point)	TL 50101 19750		MCERTS or ISO/IEC 17025 where available	

4b - Point source emissions to air only

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

No.

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

No.

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

No.

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

No.

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

No.

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

No.

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

No.

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

No.

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

As an existing operational site entering environmental permitting for the first time, sampling locations and sampling ports may not meet all of the requirements for BS EN 15259, but these are being checked onsite. Where a permanent sampling platform is not provided, however, a temporary sampling platform is utilised to provide sufficient space, in accordance with standard industry practice, where sampling cannot be undertaken from the ground.

5 - Environmental impact assessment

5a Have your proposals been the subject of an environmental impact assessment under Council Directive 85/337/EEC of 27 June 1985 [Environmental Impact Assessment]?

No.

6 - Resource efficiency and climate change

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

The Primary Digester Tanks are all suitably insulated and heated using the recovered heat from the CHP Engine. The CHP Engine is suitably sized to maximise energy utilisation for the parasitic load, while minimising the use of the flare.

Low energy lighting and LED lighting is installed across the plant. The heating water from the CHP engine is located in close proximity to the digester heat exchangers and transferred in insulated pipes to minimise heat losses in transmission.

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

The main site energy source is electricity from the site CHP, combusting indigenous biogas, supplemented by electricity imports from the public supply via National Grid to supply the treatment process. The CHP also provides useable heat for hot water to the Primary Digester Tanks via heat exchange. The CHP engine combusts indigenous biogas.

Biogas is also combusted in the boilers on site to meet additional heat demands from the Primary Digester Tanks, but the boilers are dual fuelled and can also use fuel oil when there is insufficient biogas.

Use of waste heat from the CHP Engine reduces the demand on the boilers.

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

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

Describe the specific measures you use for improving your energy efficiency

The production and use of biogas to generate electricity for export and produce heat (which is used in the digestion process) on site minimises the use of fossil fuels onsite whilst recovering biological wastes. Location of the heat exchange, boilers, CHP Engine and Primary Digester Tanks within close proximity minimises transmission losses on site, improving the efficiency of the process.

Regular and proactive maintenance of pumps and insulation of pipework will improve efficiency and minimise the electrical demands and heat losses on site.

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

See response to question 3c above.

The processes take mainly waste materials which would otherwise require additional disposal and recover energy and nutrients which can be put to beneficial use.

Small quantities of chemical raw materials are required to control and maintain the process. These are all proven materials that are extensively used within the water industry.

The other main raw materials are used in the generation of electricity and heat and maintenance of combustion plant which is supplied to the treatment process.

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

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

7 – Installations that include a combustion plant (excluding waste incinerators)

7a - List all your combustion plant at the site and provide thermal input and operating hours for each

Please see the information provided within the Technical Summary which lists combustion plant at Bishop's Stortford STC.

7b – Do any of your combustion plants have a net rated thermal input of 1 or more MW and is not an excluded MCP?

No

7c – Is the aggregated net thermal input of your combustion plant more than 20 MW?

No,

5. Form B4 Questions

1 About the permit

1a What waste operations are you applying for?, Waste operations which do not form part of an installation

The permit application is for is for two waste operations. One is for physical treatment of non-hazardous waste as a secondary activity waste operation to the main listed installation. The second import is for temporary storage of non-hazardous waste as a secondary activity waste operation to the main listed installation.

1b –types of waste accepted and restrictions

The EWC list is included in the responses to form B3.

1c Deposit for recovery purposes

This is not a deposit for recovery application

2 Point source emissions to air, water and land

Please see responses to form B3

3 Operating techniques

3a Technical standards

Please see responses to form B3

3b General requirements

Please see responses to form B3

4 Monitoring

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

Please see responses to form B3

4b Point source emissions to air only

Please see responses to form B3

6. Form B6 Questions

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

Q1About the effluent – details and type, continued

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

This effluent is a mixture of waste liquors from the operation of the installation for the anaerobic treatment of separated sewage sludge. It primarily comprises of dewatering liquors returned to the work inlet following the dewatering of treated sewage sludge and thickening processes within the installation. Lower volume constituents will include rainfall; biogas condensate; siloxane filtrate; contaminated run off and washdown water. The only wastes treated within the installation are sewage related, either being separated from the UWWTD flow in the wider works, or comprise of waste imports, principally of sludge from smaller satellite treatment works.

1b Give this effluent a unique name

Liquor returns.

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

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

Q2 About the effluent – how long will you need to discharge the effluent for?

2c Will the discharge take place all year?

Yes, the discharge will take place all year.

Q3 How much do you want to discharge?

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

215 Cubic metres

3c What is the maximum rate of discharge?

2.48 Litres / second

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

215 cubic metres

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

Q3b – The liquor arisings must come from the installation inputs as there is limited additional water inputs . The maximum volume of effluent discharged per day will consist of primary thickening liquors, post-digestion dewatering liquors and biogas condensate generated from the inputs and outputs to/from the Primary Digester Tanks.

Q3c – – Maximum rate of discharge (L/second) is generated from the maximum volume of effluent per day [214.692m^3 x 1000] / 86400 from sources such as thickening and dewatering. This gives a value of 2.484861 litres, rounded up to 2.48 litres per second.

Q3d – The liquor arisings must come from the installation inputs as there is limited additional water inputs. The maximum volume of effluent discharged per day will consist of primary thickening liquors, post-digestion dewatering liquors and biogas condensate generated from the inputs and outputs to/from the Primary Digester Tanks

Q4 No questions

Q5 Should your discharge be made to the foul sewer?

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

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

5b2 Discharges from all other premises including trade effluent

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

Q6 How will the effluent be treated?

6a Do you treat your effluent?

No. The Effluent generated by the process of treating sludge within the installation is returned to the inlet of the wider STW, where it is subject to aerobic treated in a mixture with UWWTD related waste waters.

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

Order of Treatment	Code Number	Description
First	09	Primary settlement within sewage works
Second	31	Activated sludge process
Third	21	Sand filtration

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

The final effluent discharge from the wider sewage treatment works is specified in Environmental Permit TH/CNTD.0081/011.

Q7 What will be in the effluent?

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

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

Sampling and analysis of the liquor returns to fully characterise the waste streams in accordance with BAT 3 will be undertaken at the site, in line with what is technically achievable, as per the commitment to undertake a chemical analysis of the installation's effluents as per "Return Liquors BAT 3, 6, 7" within Appendix M.

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

At present, no routine sampling or analysis for all substances listed within the referenced risk assessment at the site has been undertaken either for effluent from the installation or within the wider sewerage catchment. Thames Water commits to undertaking a chemical analysis of the installation's effluents as per "Return Liquors BAT 3, 6, 7" within Appendix M.

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

At present, no sampling or analysis for all substances listed within the referenced risk assessment at the site has been undertaken. A review of the MSDS sheets for chemicals used within the installation does not indicate the presence of any other harmful or specific substances. Thames Water commits to undertaking a chemical analysis of the installation's effluents as per "Return Liquors BAT 3, 6, 7" within Appendix M.

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

Thames Water commits to undertaking a chemical analysis of the installation's effluents as per "Return Liquors BAT 3, 6, 7" within Appendix M.

A review has been undertaken of the relevant MSDS sheets for chemical used routinely within the installation to look for substances identified within the risk assessments listed.

7f What is the maximum temperature of your discharge?

20°C back into the sewage works.

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

0°C

Q8 Environmental risk assessments and modelling

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

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

8d Discharges to groundwater

The installation does not discharge to groundwater.

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

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

8f Environmental impact assessment

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

Q9 Monitoring arrangements

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

Not applicable to this installation

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

No sampling point installed at present. Effluents will be sampled from the Sample points identified in Table B3-4a (approximately) within the installation.

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

No flow meter installed.

9e Does the flow monitor have an MCERTS certificate?

No. No flow meter installed.

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

No. Not installed as part of this installation.

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

Please see site emission point plan.

Q10 Where will the effluent discharge to?

10a Where the effluent discharges to

Non-tidal river, stream or canal.

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

No

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

N / A

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

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

Final effluent discharge.

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

TL 50270 19510

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

River Stort, via the wider UWWTD sewage treatment works.

A5.4 Is the discharge into a:

Non-tidal river.

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

No.

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

No.

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

N / A.

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

N / A.

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

No.

Appendix A. Figures

A.1 Site Location Plan

See document: B22849AM-JAC-BSD-DR-0001

A.2 Installation Boundary and Air Emission Points

See document: B22849AM-JAC-BSD-DR-0002

A.3 Site Impermeable and Permeable Surface plan

See document: B22849AM-JAC-BSD-DR-0003

A.4 Site Drainage Plan

See documents: TW_STC_EPR_20a_BSDS1ZZ-DPL-001

A.5 Process Flow Diagram

See document: B22849AZ-JA-BISHS1ZZ-LSX-DR-P-0001

A.6 A.6 Site Photographs

See document: TW_STC_EPR_20a_BSD_APPA.6

Appendix B. CoTC

See document: TW_STC_EPR_20a_BSD_APPB

Appendix C. Site Condition Report – H5

See document: TW_STC_EPR_20a_BSD_APPC

Appendix D. BAT Assessment

See document: TW_STC_EPR_20a_BSD_APPD

Appendix E. Odour Management Plan

Includes: Odour Management Plan and Odour Risk Assessment. See document: TW_STC_EPR_20a_BSD_APPE

Appendix F. Bioaerosol Risk Assessment

See document: TW_STC_EPR_20a_BSD_APPF

Appendix G. Containment Assessment

G.1 Containment Options Report (CIRIA 736)

See document: B22849AZ-JA-BISHS1ZZ-100-RP-Z-0001

G.2 Containment Assessment

See document: B22849AZ-JA-BHDS1ZZ-100-CA-P-0001

Appendix H. Leak Detection and Repair (LDAR) Plan

See document: TW_STC_EPR_20a_BSD_APPH

Appendix I. Residue Management Plan

I.1 Residue Management Plan

See document: TW_STC_EPR_20a_BSD_APPI.1

I.2 MSDS Zip File

See folder: TW_STC_EPR_20a_BSD_APPI.2

Appendix J. Accident Prevention and Management Plan

See document: TW_STC_EPR_20a_BSD_APPJ

Appendix K. Acceptance of Third-Party Waste Imports

K.1 Acceptance of Third-Party Waste Imports

See document: TW_STC_EPR_20a_BSD_APPK.1

K.2 Acceptance of TWUL Inter-Site Sludge and Cake

See document: TW_STC_EPR_20a_BSD_APPK.2

Appendix L. Air Quality Assessment

See document: TW_STC_EPR_020a_BDN_APPL

Appendix M. Liquor Monitoring

See document: TW_STC_EPR_020a_BDN_APPM